# Statistics SPSS Tutorial & Practice

(Statistic Product and Service Solution)

no a

Ririn Ambarini AB Prabowo KA Dian Ayu Zahraini

# Statistics SPSS Tutorial & Practice (Statistic Product and Service Solution)

Written by: Ririn Ambarini AB Prabowo KA Dian Ayu Zahraini

Publisher:

**UPT Penerbitan Universitas PGRI Semarang Press** 



Sanctions for violating Article 72 Law Number 19 of 2002

1. Any person who intentionally without rights commits an act as referred to in Article 2 paragraph (1) or Article 49 paragraph (1) and paragraph (2) shall be sentenced to imprisonment for a minimum of 1 (one) month and/or a fine of at least Rp. 1,000,000.00 (one million rupiah) or a maximum of 7 (seven) years and/or a maximum fine of Rp. 5,000,000,000.00 (five billion rupiah)

2. Whoever deliberately broadcasts, exhibits, circulates, or sells to the public a work and goods resulting from copyright infringement or related rights, as referred to in paragraph (1) shall be punished with a maximum sentence of 5 (five) years and/or a maximum fine of Rp. . 500,000,000.00 (five hundred million rupiah)

Photocopying or reproduction of part or all of this book without written permission from the publisher is strictly prohibited

Statistics SPSS Tutorial & Practice (Statistic Product and Service Solution) ISBN: 978-623-6602-89-8

**Written by:** Ririn Ambarini

AB Prabowo KA

Dian Ayu Zahraini

# Editor: Tim Kreatif UPGRIS Press

Cover Designer and Layouter: Lontar Media

Publisher: UPT Penerbitan Universitas PGRI Semarang Press Jl. Sidodadi Timur No 24, Dr. Cipto Semarang 50125 Jawa Tengah Telepon: 085640369110

#### FOREWORD

Alhamdulillah, thanks to Allah SWT, with His grace and permission, the book of Statistics SPSS Tutorial & Practice (Statistic Product and Service Solution) to support learning activities in universities, especially in the Faculty of Education / Universitas PGRI Semarang can be realized.

Statistics course is one of the compulsory subjects for students. This is because the Statistics course provides students with scientific knowledge and abilities in order to complete final assignments in the form of theses, especially those using a quantitative research approach. However, currently the perception of most students that statistics courses is a "scary" course for students. This book tries to give an idea that studying statistics is an easy thing and even tends to be fun. This book provides applicable examples in solving statistical problems that directly touch on problems in research implementation by using SPSS software application.

We hope this book can complement the existing statistics books, as well as reading material and adding insight for students and other readers. Finally, to all those who have helped in the preparation of this book, I would like to express my deepest gratitude. Hopefully this book is useful for students and readers who are interested in studying Education Statistics. It is fully realized that this book is still incomplete and has many shortcomings. For that, through this opportunity we ask for input for further improvement. For suggestions and contributions from dear readers, we express our gratitude.

> Semarang, August 2022 Writers

# TABLE OF CONTENT

FOREWORD	
TABLE OF CONTENT	
1. INTRODUCTION	1
2. OPERATING SPSS PRACTICUM	16
3. PRACTICUM OF DESCRIPTIVE DATA WITH SPSS	28
4. PRACTICUM OF CHARTS WITH SPSS	40
5. PRACTICUM OF CREATING A STATISTIC TABLE WITH SPSS	56
6. PRACTICUM OF NORMALITY TEST	64
7. PRACTICE OF HOMOGENEITY TEST	74
8. SPSS TEST ON ONE SAMPLE T-TEST	78
9. PAIRED SAMPLE T TEST ANALYZED WITH SPSS 21	84
10. INDEPENDENT SAMPLE T-TEST WITH SPSS	103
11. DATA ANALYSIS OF EXPERIMENT AND CONTROL CLASS FOR THESIS WITH SPSS [GUIDE 1 OF 5]	119
12. PEARSON PRODUCT MOMENT VALIDITY TEST FOR QUESTIONNAIRE WITH SPSS	156
13.CRONBACH ALPHA RELIABILITY TEST FOR QUESTIONNAIRE WITH SPSS	166
14. N-GAIN SCORE TEST EXPERIMENT CLASS AND CONTROL CLASS DATA WITH SPSS	172
15.INDEPENDENT SAMPLE T TEST FOR N-GAIN SCORE WITH SPSS	189
16. BAR CHART AND FREQUENCY DISTRIBUTION TABLE OF N- GAIN SCORE with SPSS	204
17. ONE WAY ANOVA SPSS TUTORIAL & PRACTICE	218
18. TWO WAY ANOVA SPSS TUTORIAL & PRACTICE	238
BIBLIOGRAPHY	251

# **1. INTRODUCTION**

#### **A. Understanding Statistics**

The first definition of statistics is "the study of statistics," while the second definition is "measures collected or derived from the sample." A collection of facts, figures, or non-numbers presented in tables and/or diagrams to demonstrate or characterize an issue is what Andy Field (2005) defines as statistics. In the context of statistics, "measuring" refers to the depiction of a set of data about something. This metric is created by doing calculations on a subset of data that has been chosen from the entire problem. Statistics, according to Franzese & Iuliano (2018), is the understanding of gathering, processing, or analyzing data as well as making inferences from that data.

The term "statistics" refers to a collection of numerical data about future events (Wagner, 2015). The term "accident statistics" is used in the sector of transportation, and statistical data is utilized in the context of education. Many areas of life continue to employ statistics as numerical data.

The terms statistics and quantitative data are distinct in the realm of study. Statistics is defined as a way of processing and evaluating quantitative data, whereas quantitative data is defined as data in the form of numbers. In this instance, statistics, according to Kim et al., (2018), is a technique for gathering, processing, presenting, analyzing, and interpreting numerical data. The approach must be able to offer methods for not only gathering, processing, presenting, and evaluating data, but also for using the results of the calculation of samples drawn at random from the community in question to infer features of specific populations. According to Ave (1999), statistics is the discipline of gathering, organizing, analyzing, and interpreting numerical data with the aim of improving decisions in the face of uncertainty. In this context, statistics is defined as the discipline of gathering, assembling, analyzing, and interpreting numerical data in order to improve decisionmaking under uncertain conditions.

According to Vanlalhriati & Singh (2015), statistics are a set of procedures and guidelines for gathering, processing (analysis), and drawing conclusions from numerical data under specific presumptions. In accordance with this last view, Singpurwalla & Lai (2020) makes the case that statistics are a set of scientific techniques designed to gather, assemble, display, and analyze research data as numerical data. Additionally, statistics are anticipated to offer a trustworthy foundation for making wise selections.

According to Rasch et al., (2012), statistics is a set of techniques that address the following topics: (1) how to gather data that can provide the best information; (2) how to summarize, process, and present data; (3) how to analyze a set of data so that certain strategies emerge from the analysis; (4) how to draw conclusions and suggest decisions that should be taken on the basis of existing strategies; and (5) how to estimate the likelihood of errors when relying on existing strategies.

#### **B.** Descriptive Statistics and Inferential Statistics

In the field of research, statistical terms are distinguished from quantitative data. Statistics is defined as a way of processing and evaluating quantitative data, whereas quantitative data is defined as data in the form of numbers. According to Johnson, (2014), statistics is a technique for gathering, handling, presenting, analyzing, and deciphering quantitative data. The approach must be able to offer methods for not only gathering, processing, presenting, and evaluating data, but also for using the results of the calculation of samples drawn at random from the community in question to infer features of specific populations.

In accordance with this last view, Kim (T. K. Kim, 2017) makes the case that statistics are a set of scientific techniques designed to gather, assemble, display, and analyze research data as numerical data. Additionally, statistics are anticipated to offer a trustworthy foundation for making wise selections.

Numerous methods for analyzing quantitative data have been developed by statistics. Descriptive statistics and inferential statistics make up the two main categories of quantitative data analysis approaches.

#### 1. Descriptive Statistics

In order to provide an organized, succinct, and clear picture of a phenomenon, state of events, or other phenomenon from which understanding or meaning can be inferred, descriptive statistics examine the methods for gathering, compiling, presenting, and analyzing research data in the form of numbers. certain. Tables, graphs, the means, medians, modes, measurements of data variance, and other statistical techniques that solely seek to understand the description or trend of the data without attempting to generalize are categorized as descriptive statistics (Franzese & Iuliano, 2018).

According to Vanlalhriati & Singh (2015), descriptive statistics are those that are used to describe or analyze a statistic of study findings, but they are not utilized to draw broader inferences or generalizations. Sugiyono went on to say that descriptive statistics will be used in research without a sample. Similarly, descriptive statistics are utilized in research that uses a sample but does not attempt to draw generalizations about the population from which the sample was drawn. The focus of the research on descriptive statistical analysis as it was characterized by Wilmot & Mansell (2014) is as follows:

a. Frequency distribution and measurement of statistical values such as measurement of central value, dispersion, skewness and kurtosis, and graphs such as polygons, histograms and gives.

b. Index number.

c. Time series or time series.

d. Simple regression coefficient and correlation coefficient.

The same thing is explained by Everitt & Skrondal (2006) regarding the scope descriptive statistical studies, namely (Jackson, 2009; Rusydi & Fadhli, 2018; Vanlalhriati & Singh, 2015):

a. Data presentation in the form of tables, such as frequency distribution tables, single tables, and contingency tables.

b. The presentation of data as graphs, including bar charts, line charts, pie charts, scatter plots, map plots, symbol diagrams, and diagrams of the frequency distribution of the table, such as the histogram, frequency polygon, and provide.

c. Center-and-location measures include mean, median, mode, variance, standard deviation, quartiles, deciles, and percent.

d. Dispersion or deviation measurements such the standard deviation, variance, mean deviation, and range.

e. The slope of the curve and the sharpness of the curve distribution make up the data distribution model.

f. Index number.

g. Times series / time series or periodic data.

#### 2. Inferential Statistics

Inferential statistics are those that analyze or develop methods for inferring information about population traits from quantitative data gathered from research samples (Rusydi & Fadhli, 2018). Generalization or induction is the process of drawing generalizations about the features of a population based on sample data drawn from the community. As a result, inductive statistics and inferential statistics are synonyms. Inferential statistics offers specific guidelines for formulating or producing forecasts and estimates in addition to the generalization function (Field, 2005; Franzese & Iuliano, 2018; Garth, 2008; Jackson, 2009; Oliver-Rodríguez & Wang, 2015; Singh, Kumar, 2006; Vanlalhriati & Singh, 2015).

Gerald (2018) explain the study's inferential statistical analysis's purview as follows: a. probability.

b. Theoretical distribution.

c. Sampling and sampling distribution.

d. Estimated price parameters.

e. Testing of hypotheses, such as the chi-square test and the analysis of variance.

f. Prediction using regression analysis.g. Correlation and significance test.

h. Time series or time series.

i. Simple regression coefficient and correlation coefficient.

Furthermore, Gerald (2018) explains the scope of the study of inferential statistics as follows:

a. Analysis of the test requirements, including the normalcy test, homogeneity test, linearity test, and multicollinearity test.

b. Association hypothesis testing using the canonical test, path analysis test, regression test, and correlation test.

5

c. Comparative hypothesis testing using the t test, 2-group difference test, Tucket test, analysis of variance, analysis of covariance, multivariate analysis of variance, and multivariate analysis of covariance, among other methods.

#### **D.** Parametric and Non-Parametric Statistics

Parametric statistics and non-parametric statistics make up the two categories of inferential statistics that seek to generalize. A method of data analysis known as parametric statistics calls for certain demographic properties, such distribution normality and data homogeneity, to be assumed or tested. While non-parametric statistics is a quantitative data analysis technique that disregards the parameters and does not call for assessment of population features (Friedrich et al., 2017; Garth, 2008; T. K. Kim, 2017; Oliver-Rodríguez & Wang, 2015; Orwa et al., 2014).

According to the assumptions and the kind of data to be evaluated, Jackson (2009) describes how to utilize parametric and nonparametric statistics in this situation. Numerous suppositions must be met for parametric statistics to work. The underlying presumption is that the data being studied must have a normal distribution. The data of two or more groups being evaluated must also be homogeneous in order to use one instrument, and regression requires that the linearity assumption be met. Nonparametric statistics do not rely on a lot of presumptions, such as that the data being studied are normally distributed.

Additionally, Garth (2008) adds that nonparametric statistics are primarily used to evaluate nominal or ordinal data from populations that are free of distribution, while parametric statistics are primarily used to examine interval or ratio data collected from normally distributed populations (not necessarily normal). Quantitative data analysis has two distinct goals in terms of research objectives: figuring out how variables relate to one another and figuring out how two or more sample groups differ from one another. Correlation and regression analysis were used to ascertain the link between the variables, while comparative analysis was used to ascertain the distinction between two groups of samples or more (Chakrabarty, 2018; Ioan, 2016; Johnson, 2014; Singpurwalla & Lai, 2020; Vanlalhriati & Singh, 2015).

#### **B.** Types of Research Data

In quantitative research, data analysis focuses on the values of the collected data. Sometimes data values take the shape of numbers, while other times they do not (Ave, 1999; Chakrabarty, 2018; Oliver-Rodríguez & Wang, 2015; Sharma, 2017). The worth of the numerical data, such as the significance of the learning outcomes data (6, 7, 5), the degree of intelligence (100, 110, 105), and a score indicating students' level of interest in learning (30,25,45). The worth of the student's gender (male or female), as well as the worth of their ethnicity (Javanese, Sunda, Bugis, Betawi).

The target of study typically comprises of components or elements known as research data. Data is a concept that demonstrates varying symptoms; the used symptoms change depending on the level or magnitude (Everitt & Skrondal, 2006; Horton & Switzer, 2005; Orwa et al., 2014). Symptoms that differ by type or classification, such as gender, which has male and female forms. Additionally, there are other jobs for farmers, traders, fishers, and others.

Different types of symptoms are referred to as discrete data or nominal data. Because other nominal data are distinct from one another, nominal data are referred to as discrete data. Symptoms that change depending on their severity or intensity, such as variations in wealth, IQ, height, weight, and the like (Garth, 2008; Rusydi & Fadhli, 2018; Vanlalhriati & Singh, 2015).

Continuum symptoms, also known as continuum data, are symptoms that vary depending on the level. The values of the continuum data are not clearly distinguished. The continuum data value is essentially a continuum. There are three categories of continuum data: ordinal, interval, and ratio (Everitt & Skrondal, 2006; Field, 2005; Franzese & Iuliano, 2018; Jackson, 2009). Therefore, quantitative research data is split into four groups based on the nature of the data value, namely:

#### 1. Nominal Data

Qualitative descriptive data is what nominal data is. Nominal data values are presented as classifications, but there is no level of differentiation between the classifications. For instance, the value of tribal data from Java, Sunda, Madura, and Bangka is classified without level (Franzese & Iuliano, 2018; Rusydi & Fadhli, 2018; Wagner, 2015). Even though numbers are used for nominal data values, they are just employed as symbols to make analysis easier and nominal data values do not take the shape of numbers. Rusydi & Fadhli (2018) uses the example of "A researcher dealing with data relating to the sex of pupils (female and male)" to demonstrate his point. Researchers must convert the data into numbers in order to apply statistics in their

analysis. If the researcher chooses the numbers 1 and 2 as symbols for female students and male students, respectively, then those numbers represent the genders' initials. The researcher will henceforth always be addressing numbers 1 and 2. Given that these numbers are merely symbols or codes, number 2 in this instance does not imply that number 1 is greater. The numbers are included as a nominal scale data group as long as they are only used as symbols by the researcher (Orwa et al., 2014; Rusydi & Fadhli, 2018; Vanlalhriati & Singh, 2015).

#### 2. Ordinal Data

Ordinal data, as opposed to solely nominal data, also indicates categorisation. Ordinal data classification essentially demonstrates that there are levels between one another. For instance, information on the degree of education among young people in a particular location, including Elementary/MI, SMP/MTs, and SMA/MA. Student rankings (rank 1, 2, 3, etc.) are another example of an ordinal (Franzese & Iuliano, 2018; Rusydi & Fadhli, 2018; Singh, Kumar, 2006; Wagner, 2015).

These two examples demonstrate that ordinal data can have a numerical value, but it may not always have a numerical value. Ordinal data has two features: (a) it has a classification or classifications, and (b) its value denotes the presence of levels. However, neither the level nor the level of the difference is constant or has a set interval (Everitt & Skrondal, 2006; Vanlalhriati & Singh, 2015).

Irianto Garth (2008) provides the following illustration of the situation involving ordinal data: "A researcher is presented with data pertaining to student semester exam results stating that (1) student A is the first place winner, (2) student B is the second winner, (3) student C is the third place winner, and so on. Although the number 1 here has a higher value than the numbers 2 or 3, this scale is unable to definitively distinguish between A, B, and C's abilities (Rusydi & Fadhli, 2018; Wagner, 2015). The first place winner does not necessarily mean that they are twice as talented as the second place winner or three times as talented as the third place winner. Additionally, it's unlikely that the gaps in talents between the students who placed first and second and the children who placed second and third are the same.

As a result, even though the numbers used as a stand-in have the same range, the range of students' skills for each winner is not always the same (fixed). The best use of numbers is not necessarily dictated by tiny numbers. Thus, the researcher might proceed on the premise that a higher number is preferable. When describing the outcomes of statistical analysis, attention must be taken to take into account the amount of the data as well as the location of the numbers as a proxy for good or bad (Field, 2005; Oliver-Rodríguez & Wang, 2015). From coding to explanation, characteristics must be consistent.

#### 3. Interval Data

Numbers are used to represent the values of interval data, which are categorized as continuum data. The values in the interval data represent the findings of measurements, such as the findings of assessing intelligence level, learning interest, and learning outcomes (Ave, 1999; Everitt & Skrondal, 2006; Friedrich et al., 2017; Wagner, 2015). Numbers (120, 110, 90, 115, etc.) are used to express the level of intellect (IQ).

The measurement instrument's units of measure must be equally spaced apart, or at least close to it, in order for the measurement to satisfy one of the requirements. In this instance, measurements in the exact sciences, such as biology, chemistry, and physics, typically have a higher level of precision than measurements in the social sciences and education (H. Kim et al., 2018; Parthiban & Gajivaradhan, 2016). In the social sciences, it may be more appropriate to remark that the units of measurement are close to the same, but measurements in the precise field can typically be carried out using equidistant units of measure (relatively equidistant).

Data that is interval scaled is referred to as interval data. The interval scale includes three features, including (a) the existence of a classification or classification, (b) the value of the data indicating the existence of a level, and (c) the equidistant nature of the units of measurement (Ave, 1999; Everitt & Skrondal, 2006).

Rusydi & Fadhli (2018) provides the following illustration pertaining to interval data: The range of student grades that researchers must deal with is 0 to 10. From 0 to 100 Celsius is the temperature range. In this instance, students who receive a score of 8 have double the aptitude of students who receive a score of 4, and the heat of the air at 15 degrees Celsius is equal to that at 30 degrees Celsius. But when pupils receive a score of 0, it does not necessarily suggest that the air is completely devoid of temperature or that they have no knowledge of the subject matter being examined. This continuous (fixed) range between levels enables the interval scale to constantly give a general picture of the thing being evaluated.

#### 4. Ratio Data.

Values from ratio data measurements are more accurate than those from interval data. Measurement findings utilizing equidistant units of measure that have absolute or obvious zero points are known as ratio data values (Allen, 2017; T. K. Kim, 2017). The issue of the zero point in the measuring process is what distinguishes interval data from ratio data. Social science measurement techniques typically lack the accuracy needed to pinpoint the zero point. The properties of the measurement device, which are internal to the research subject, are mostly to blame for this. It is impossible to determine that a student's learning objectives didn't exist at all, even if they were all erroneously answered by them (score = 0). As a result, measures in the field of

education typically only yield results at the interval scale level (interval data) (Garth, 2008; Jackson, 2009; Wilmot & Mansell, 2014).

The values of ratio data are expressed numerically. The ratio data figures indicate that there is a level, and these values may be compared because they have an absolute zero point. Thus, ratio data has four characteristics: (a) it has a classification or classification, (b) the data value shows a level, (c) the unit of measurement is equidistant, and (d) it has an absolute zero point (Everitt & Skrondal, 2006; Ostertagová & Ostertag, 2013; Singpurwalla & Lai, 2020).

#### **C.** Types of Research Variables

#### 1. Independent variable.

Independent variables are also known as stimulus variables, input variables, predictor variables, and antecedent variables. It is commonly referred to as the independent variable in Indonesian. The independent variable is the variable that causes the dependent variable to occur or change (the dependent variable). So the variable that influences is the independent variable. The independent variables in statistical investigations of structural equation modeling (SEM) or structural equation modeling are referred to as exogenous variables (Parthiban & Gajivaradhan, 2016; Rusydi & Fadhli, 2018; Singpurwalla & Lai, 2020).

#### 2. Dependent variable.

The response, output, criteria, and consequence variables are all names for the dependent variable. It is frequently referred to as the dependent variable in Indonesian material. The dependent variable is the one that is affected by or results from the independent variable. The independent variables in statistical investigations of

structural equation modeling (SEM) or structural equation modeling are referred to as endogenous variables. Each independent and dependent variable is always in pairs, such as Leadership and Work Productivity (Leadership as the independent variable, Work Productivity as the dependent variable), Heat and Expansion of Length (Heat as the independent variable, long expansion time as the dependent variable) (Ioan, 2016; Jackson, 2009; Singh, Kumar, 2006; Vanlalhriati & Singh, 2015).

#### 3. The moderator variable.

The link between the independent and dependent variables is influenced by the moderator variable, which can either increase or diminish the association. It's common to refer to this variable as the second independent variable. For instance, if a teacher and students have a good communication, their relationship will be more intimate (Rusydi & Fadhli, 2018; Singh, Kumar, 2006). A moderator variable that strengthens the association in this example is the a good communication. But on the contrary, the teacher and students' interaction will be more tenuous if there is a "third party". In this case the third party is the moderator variable that weakens the relationship. Another example is the relationship between ability and learning outcome will be higher if the motivation is high, and the relationship between ability and learning outcome will be lower if the motivation is low. Motivation as moderator variable.

#### 4. Intervening variables.

The relationship between the independent and dependent variables can theoretically be strengthened or weakened by intervening variables, which are not observable. For instance, intelligent students will typically have high test scores, but occasionally intelligent kids will also have low test results. It was discovered that the student had been harmed and aggravated while attempting the exam questions. There are intervening variables that are still challenging to quantify, such as heartache and frustration (Everitt & Skrondal, 2006; Singh, Kumar, 2006).

#### 5. Control variables.

The control variable is a variable that is kept constant or under control in order to have no impact on the primary variables under investigation. If the researcher plans to do research, particularly by employing experimental procedures that involve comparisons, the control variable will be chosen by the researcher. For instance, researchers aim to compare the typing speed of high school graduates versus those with a vocational degree (Field, 2005; Ioan, 2016). It is important to identify the control variables for this study, which include the same typed script, typewriter, workspace, and time used. In order to complete the previous sentence about the categories of variables, Rusydi & Fadhli (2018) also offers the following additional explanations about the sorts of variables:

#### 1. Confounding variables.

Independent variables that are researched but not discovered as confounding factors avoid being controlled or regulated. Due to the presence of these confounding variables, the research findings are flawed and can lead to the incorrect research hypothesis being accepted (Oliver-Rodríguez & Wang, 2015; Sharma, 2017; Singh, Kumar, 2006; Solutions, 1918).

#### 2. An antecedent variable.

An antecedent variable is a variable that affects the independent variable. In a study this variable is usually expressed in the implications of a study (Field, 2005).

#### 3. Covariate variables.

Covariate variables are independent variables whose existence is restricted and statistically controlled to prevent tampering with the findings of the study. Therefore, the covariate variable itself serves as a control variable; the only difference is that statistical methods are used to carry out the control or control. The context must be assessed in light of the underlying theoretical ideas as well as the findings of empirical observations at the research site in order to be able to determine the positions of the independent, dependent, moderator, intervening, control, and other variables. This makes it necessary to do a theoretical study and a preliminary study on the object to be investigated before the researcher decides what variables to study (Everitt & Skrondal, 2006; Field, 2005; Solutions, 1918; Wagner, 2015).

# 2. OPERATING SPSS PRACTICUM

## SPSS (STATISTICAL PROCEDURE AND SERVICE SOLUTION)

In this first practice, it will be discussed on how to start operating the program, enter data, store data, call / open data and terminate the program (Everitt & Skrondal, 2006; Field, 2005; Garth, 2008; Gerald, 2018; Oliver-Rodríguez & Wang, 2015; Wagner, 2015).

#### 1. Starting SPSS

If you are going to start SPSS 10.0 for Windows, the steps you should take are:

- a. Click **START** menu, then select Programs.
- b. Select SPSS items, e.g SPSS 10.0 for Windows, the following picture will appear:



In the view there are two windows or windows. The first is the SPSS data editor and the second is some menu option that can be used in further analysis related to data management.

## 2. MAIN MENU

Some of the main menu items that are important in SPSS are as follows:

- a. File; it contains management or management facilities and data files
- b. Transform; it is used to manipulate data
- c. Analyze; it is used for data analysis
- d. Graph; it is used to visualize data
- e. Utilities; it is used in connection with utilities in SPSS 10.0.

The menus you can see in Figure 2 below:

	6.0	[ re	x E	61			1		<u>25</u>	1		1					
																10.00	0000
	M.	-	1	L		-				W		1			-	1.00	- 18-
1																	
1																	
100																	
				_										_			_
							-										
1.				_													
				_													
T	_	_		_	_	_		_	_	_	_	_		_			
1																	
11																	
u																	
T																	
н.			_	_			_				-		-			_	
1				_		_	-	_					_	_	_	_	-
1	_	_	_	_		_	-	_				_		_	_	_	-
11							-										
11 11																	
and the second second																	
2							-										
1							-										
	_			-	_		-					-		-	_		
		_					-				_	_				-	-
1.14	-					_		_	-								

# 3. DEFINITION OF VARIABLES

In the sheet variable view (in the bottom left corner), it is used for defining variables that include:

- a. Name: to name the variable to be inserted into the data view field
- b. Type: to format data according to the type of data entered, eg numerical (numbers, whether using decimal or not); string (non digits or text or characters)
- c. Width: to set the column width of the data.
- d. Decimal: to set the number of numbers behind the comma.
- e. Labels: to give explanation of variable or data f. Align: to adjust data flattening, ie left, right or center.
- 4. Entering the data

Entering data can be done in 2 ways as follows:

- a. Enter the data first then define the variable name. The steps to be taken are:
  - From the main menu the data can be directly inserted into its cells as it looks like the following picture.

Contraction of the second					
1000 1000	And I ADD TO A	the second second	A second line in	and inclusion. The second	The second second
and the second second second	Contract of the local division of the local	IN THE R. L. LEWIS CO.	A CONTRACT OF A	STREET, STREET	And in case of
And a second second	second and the second	idel[-18	a presentation of the	COLUMN A DAMAGE	COLUMN TWO IS NOT

								_	_
_	VAR00001 W441000	1/142100511	W\$100001	18	- 18	-	1 mm 1	100	4
1	AND BUILDING THE	Triffyrtal (d	1	_		_	_		_
2	5000000 enab	PPNA .	E.						
2	99000028 (armi	mufarmacia		_			_		_
1	SSOCIE DI GRA	precas de	A		_	_			_
\$	99000109 (Swa	percente.	8						
				_		_	_	_	
			_	_					
1			_				_		
-				_					_
C			_						
1				_					-
U - 1				_		-			
			_						
H			-	_	_	_		_	-
16.									
er i									
-									
1									
10									-
1									
15									

2) Rename the variable with the appropriate name, for example the order of the variable names is NIM, NAME, SUBJECT (KULIAH), and SCORE. The step is click the **variable view** so the following picture appears. Change the default variable SPSS with the appropriate variable name.

	ALC: NO	500	Wes.	Decree .	Lini	Viter	Party	Columns	Aar	Vacura I	1.40
I	-	Hanake	1			10010	10/16	1	The set	126 auto	Ma
1	1979	5.05	1	1		ium:	Note:	4	# Get	di tenta	Stee
)	kaćar	3119	2	1		Wite:	fore -	4	<b>新</b> 144	di honce	Stat
1	160	3.44	1	1		None	Ne	3	斎(ut)	d. 10002	Sta
				£					94-2	1	
		_							_		
1										_	
1											
1											
1					_	_	_	_	_		_
5							_	_		_	_
1		_				_	_	_	_		_
16. I		-									
5	<u> </u>	-							_		
-				_		_				_	
4	_							_			
1											
									-		
									-		
				-							
	-								-		
2											

Stand Balat- 8/953minter De

 If you want to see the effect of variable replacement, click the data view so that the display looks like the following picture:

	1.1					1.00	28	_								ł
		( best	1.041	10.1	-	1.00		-				-		14	-	l
	NOTE: 10	restuita	-													
	WWW find	Page														
¥.	10120-001	remain														
	THEFT	press.	-													
	PODDilee	hereit														
		_	_			-	_	_	_	_	_	-	_		_	1
	_	_	_	_		_		_		-	_	_	_	_	_	ł
	_	_	_		_			_		_	_					ł
		-	_	_		-		-	-		_	-	_	-		÷
H																
				-			_		-			-			-	i
															-	ł
ineriti i																
		-				_	-						-			
-	4	-			-		-	_		_	_	-	-		-	i

- b. Defines the variable first and then inserts the data. The steps that must be done is as follows (previously select the file menu, then new, data):
  - 1) Enable the variable view (in the lower left corner).
  - Fill in the name of the variable in the name field as shown in the display in the image below:

App         Oth         App         App <th></th>	
enter 1 27 ban Din V 20150 Alement Viger enter 1 2 ban Din V 20150 Alement Viger	
end 3 7 the the 8 Might Advent Nam	
ann 1 2 an ba 8 2.5gt àinns 1.5gt	
ومناهدة المتراجة بمتراجع المتراجع المراجع	

 Arrange the type of the column as needed by clicking on the existing cell variable name, choose the appropriate data type (see picture below).

	الغابال	. Tree		1-1-1	.14			( Dataset	101	( Description	14	
Ċ.	100	Baran				7441	1404		Bie.	(ITTAL)	Alar	
	10.00	iterary.	1	1		1481	100	1	Wiger.	Atom	Ver	
	in the second	Bern		1		See	10.0	1	Mine .	Alman	Ann	
5	154	Margine 1	1	4	-		194		in Loss	Atomic,	Nur	
					100	ak far						
					12	12						
									122	-		
					1							
						Alternation			Thingson			
	-				100							
2												
					115							
					and the second second		Course 1	inerer.	1			
2					1							
	-					the boomed dig	anyonah	1,149	ing inches	NACE:		
					100	Statistics.	or support					
							. 10	1.018	112			
-					-	-	-	-	-	_		
	-											
t	-											
ł												
1												
*	-	_							_			
			_	_	_	_	_	_	_			

- 4) Click OK button to continue, or cancel if you want to cancel it.
- After the definition is done then the entry is done then the data can be filled with the first activation data view.

日前部	II c		加耳	1 A		<u>×</u> #	HA -	.HAR	à. 🗄 :							
Sec. 1															state 14	-
1.00 - 100	111110	1000	in the set	1	100	1.00	1.000	10					- 10	1.18	The second	T
10																
1																
1																
	-			_	_	_				_	_	_		-	_	
	-															
-	_					÷										
-																
	_				_		-							-		
and the second se																
	_	1			_										-	
14																
					_					-						
116 (C)																
58	_	_	_				_									1
Tes ( Installe)	W															

## 5. STORING DATA

Saving documents or storing data is recording all documents to disk or hard drive. The data in SPSS has a sav extension (.sav). While the output of the data processing conducted by SPSS extension spo (.spo). The steps to save are as follows:

- a. Storing data
  - 1) If the data file has not been opened, then open the first data file to be saved.
  - Then choose file menu → save as (if not already saved) or save (if it has ever saved), so the following picture appears:

1	i jugatsta		18.00 k 801
	VECUT Tubbi Useroli BUILS oby calentia MORE al Pis, MORE al Pis, MORE to Burris MORE the Second	Cardina Constant of the second	
<b>A</b> .	FL.		20/00/address 1.00

- 3) Choose where to save the data by clicking on the save in option box.
- If you can place, in the file name field, fill in the name of the data file with the extension. Sav.
- 5) When the name is correct, then press save button.
- b. Saving output (result)
  - If the output file has not been opened, then open the first output file to be saved.
  - 2) Then select file menu, save as (if never saved) or save (if it has been saved).
  - 3) Select a place to save the output by clicking on the save in option box.

- 4) If you can place, in the file name field, fill in the file name of the data with the extension .spo.
- 5) When the name is correct, then press save button.

## 6. OPENING DATA / OUTPUT

Opening or data processing (output), means to reopen a document that has been saved.

This is done to make improvements or to analyze the results of data processing.

a. open the data

Steps to call / open data data are:

1) Tap the open icon or select the file menu  $\rightarrow$  open  $\rightarrow$  data, then it appears

ed stream				 ALLA LIGHTAN
1 MUTTO una escenaria d 1 MUTTO una escenaria d 1 MUTTO na Evo B 1 MUTTO na escenaria d 1 MUTTO na	E bete E and East Ante E Ante			 8
	The new Contraction of the Contr			
The second secon		8-7110	ing Roop	

2) Specify the folder (file) to be opened in the Look in icon.

- Click the name of the file you want to open, then click the open button on the right of the File Name icon.
- b. Open output results. Steps to open output results are:
  - 1) Select File menu  $\rightarrow$  open  $\rightarrow$  output, then the following layer appears
  - 2) Set up the folder (file) to be opened in the Look in icon.
  - Click the name of the file to be opened, then click the open button on the right of the File Name icon.
- 7. End the SPSS

As the other software, to end the work of a software is done by activating the File menu, then click **EXIT**. Another way is done by pressing the image **X** (cross) which is on the right top right **Title Bar**.

# **3. PRACTICUM OF DESCRIPTIVE DATA WITH SPSS**

# 1. FREQUENCIES

Frequency is about data in various size such as mean, median, percentile, and others (Franzese & Iuliano, 2018; Horton & Switzer, 2005; Vanlalhriati & Singh, 2015; Wilmot & Mansell, 2014). We will make table frequency and create descriptive data on the variable of the students' age. We must follow this steps :

- 1. Open/activate file 'New Student' (mahasiswa baru) from Practicum 1
- 2. From the main menu of SPSS, choose menu **analyze**  $\Rightarrow$  **Descriptive Statistic**  $\Rightarrow$

Frequency that are from main menu. It shows as the followings :

<b>1</b>	Frequencies	
GENDER GENDER FARENTSPAYMENT GRESIDENCE NEM Display frequency tables OK		Statistics Charts Eormat Bootstrap

3. In variable box. fill the variable of students' age by clicking age variable in the left

```
box and click ( ) to move it to the right box
```

4. Click statistic to create descriptive data, until the following picture appears :

Percentile Values           Quartiles           Cut points for:           Percentile(s):	Central Tendency ✓ Mean ✓ Median Mode	
Add 10.0 Ohange Remove	Sum	
Dispersion Std. deviation  Minimum Variance  Range  S.E. mean	<ul> <li>Values are group midpoint</li> <li>Distribution</li> <li>Skewness</li> <li>Kurtosis</li> </ul>	

Fill statistic box according to needs of descriptive data that will be showed. To create uniformity, do the steps like the picture above. When we click Percentile(s), we must fill number 10 on the right box, then click the icon add until number 10 move to the bigger box. Do the same thing on number 90.

- 5. And then click **CONTINUE**
- 6. After the data entry is finished. Click **OK**

# Statistics

N	Valid	30
	Missing	0
Mean		22.0000
Std. Error of I	.39538	
Median	22.0000	
Std. Deviation	2.16556	
Variance	4.690	
Skewness	1.222	
Std. Error of Skewness		.427
Kurtosis	2.341	
Std. Error of Kurtosis		.833
Range	10.00	
Minimum		19.00
Maximum	29.00	
Percentiles	10	20.0000
	25	20.0000
	50	22.0000
	75	23.0000
	90	25.0000

		Frequency	Percent	Valid Percent	Cumulative Percent
20. 21. 22. 23. 24. 25. 29.	19.00	2	6.7	6.7	6.7
	20.00	6	20,0	20.0	26.7
	21.00	6	20.0	20.0	46.7
	22.00	6	20,0	20.0	66.7
	23.00	4	13.3	13.3	80.0
	24.00	2	6.7	6.7	86.7
	25.00	3	10.0	10.0	96.7
	29.00	1	3.3	3.3	100.0
	Total	30	100.0	100.0	64,11-154,94

- 7. Results :
  - a. Students whose age is 19 Years Old : 2 people
  - b. Students whose age is 20 Years Old : 7 people
  - c. Etc.

## 2. DESCRIPTIVE DATA

Descriptive data is used to create some data such as mean, standard deviation, varians and others. For example we will describe the variable of *NEM* (High School Score) on student data. We must follow the following steps :

- 1. Open/activate the file of 'new student' (mahasiswa baru) from practicum 1.
- 2. From the main menu of SPSS, We must choose **analyze**  $\Rightarrow$  **Descriptive Statistic**  $\Rightarrow$  **Descriptive**, and then the following picture will appear :

<b>()</b>	Descriptives	×
AGES PARENTSPAYMENT	Variable(s):	Options. Bootstrap
Save standardized values		Help

- In variable box, fill NEM Variable by clicking variable NEM that's in the left box and click ( ) to move variable NEM to the right box
- 4. Click option to make descriptive data, until the following picture appears.

<b>V</b> M	ean	🗖 <u>S</u> um
Disp	ersion	1
<b>1</b> S	td. deviat	ion 🛃 Mi <u>n</u> imum
	ariance	📝 Maximum
E E	Range	S. <u>E</u> . mean
Dist	ribution	
	Curtosis	Ske <u>w</u> ness
Disp	alay Order	÷
• v	aria <u>b</u> le lis	st
	Iphabetic	
ØA	scending	means
OD	escendir	ig means

The entry on the **option** box depends on the descriptive data that is presented. For uniformity, choose the options : mean, Std deviation, Minimum, Maximum.

5. Click **CONTINUE** and **OK** if it is already finished.

Descriptive Statistics	
Y 바람이 바람이 있는 것은 것은 것을 가지 않는 것을 것을 것을 것을 수 있다.	

	N	Minimum	Maximum	Mean	Std. Deviation
NEM	30	40.90	70,40	60.4500	6.88631
Valid N (listwise)	30		3	5	3

### 6. Result :

- a. The number of students (N) that are analized : 30 People
- b. NEM SLTA minimum : 40.90
- c. NEM SLTA Maximum 70.40
- d. Mean of NEM: 60.4500
- e. Standard deviasi 6.88631

### 3. CROSSTAB

Crosstab shows data that is is tabulation consisting of rows and column. For example you will make crosstab between gender variable by using the data of education from students. We must follow the following steps :

- 1. Open the file of 'new student'.
- 2. From the main menu of SPSS, choose menu **analyze**  $\Rightarrow$  **Descriptive Statistic**  $\Rightarrow$  **Crosstab**, until the following picture appears:

AGES PARENTSPAYMENT RESIDENCE NEM	Column(s):	Exact. Statistics Cells Format Bootstrap.
	Layer 1 of 1 Previous Next	
Display clustered bar char     Suppress tables     OK	Display layer variables in table layer ts Paste Reset Cancel Help	5

- 3. In the ROW(s), fill in with Recent Graduate variable.
- 4. In the box of Column(s), fill variable Gender
- 5. Click **OK** to end the entry and the result will be like the following picture:

Count		20		-20	
			GENDER		
		Female	male	Male	Total
SHS	MA	9	3	5	15
	SMK	4	0	4	5
	SMU	3	1	3	7
Total		16	2	12	30

- a. More female students than male students.
- b. Male students whose recent graduate at MA: 6 people
- c. Female students whose recent graduate at SMK: 4 people

d. ETC.

### 4. CASE SUMMARIES IN ROWS

Case Summaries shows summary of variables with case view. In **Case Summaries in Rows**, data will be presented according to rows. For example case summaries in rows for the variable of 'age' and *NEM* (high school score) based on the recent graduate on the data of the students. The steps will be as follow:

- a. Open/activate the file of 'new student' (mahasiswa baru) from practicum 1.
- b. From, the main menu of SPSS, choose menu analyze  $\Rightarrow$  reports  $\Rightarrow$  reports

summaries in rows, and the following picture will appear:

Data Columns Data Column Variables: AGES NEM Format.
Break Columns Break Column Variables: Break Column Variables: Break Column Variables: Soft Sequence Soft Sequence Ascending Descending Descending Eormat

- c. In data Column, fill the variable of age and NEM.
- d. in Break column, fill variable recent graduate.

e. Activate **Display Cases** that's in lower side of dialog box.

BHB	ASES	NEM		23.00	63.80
-					
164			SMU		
	23.00	67.20		19.00	57.80
	21.00	70.40			
	22.00	65.40		20.00	
	19,00	63.10		22.00	58.20
	21.00	07.90		21.00	67.10
	20.00	58,20		25.00	62.30
	20.00	37.90		20.00	56.70
		the second se			07. KO107.
	24.00	65.30			
	25.00	48.30			
	24.00	52.60			Page 2
	22.50	49.50			
	20.00	68.70	SHS	AGES	NEM
	29.00	53.60			
	21.00	57-30	5 <u>1</u>	ă %ă	: : <u>1</u>
	22.00	#1.70			
			SMU		
SMOC .	THE REPORT OF A DECK			22.00	56.80
	22.00	45.20			
	25.00	63.40			
	22,00	36.90			
	20.00	64:20			
	31.00	69,30			
	22.00	67.50			
	21.00	68.20			

f. Click **OK** to end the entry and the result will be like the following.

#### **5. OLAP CUBES**

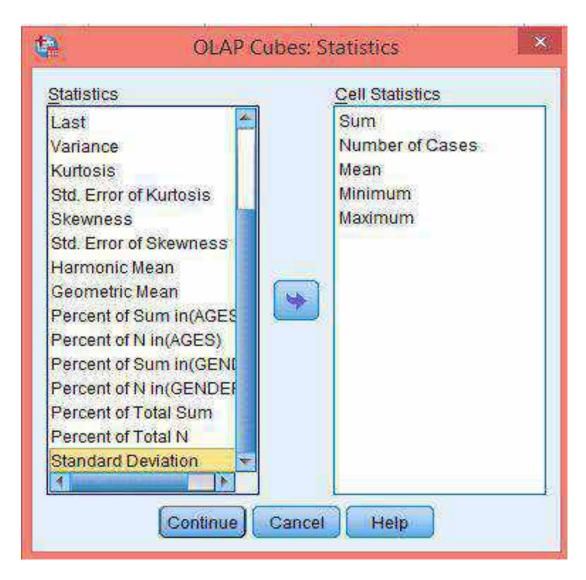
Olap Cubes is used to summarize data easily and can contain various variables. For example to see *NEM* variable from **age** and **gender** variables. The steps are as follow:

- a. Open/activate the file of 'new student' (mahasiswa baru) from Practicum 1.
- **b.** From the main menu of SPSS, choose menu Analyze  $\Rightarrow$  Reports  $\Rightarrow$  Olap Cubes, until the following picture appears.

•	OLAP Cubes	×
ARENTSPAYMENT	Summary Variable(s):          Image: Summary Variable(s):         Image: Sum	Statistics Differences Title
ОК (	Hide small counts Less than 5 Paste Reset Cancel Hel	p

- c. fill *NEM* variable to Summary Variable(s) box;
- d. fill **age** and **gender** variable to Grouping Variable(s) box;
- e. click Statistics and then choose Mean, Sum, Min, Max and end by clicking

**Continue**, until the following picture appears:



- f. Click Title to describe detail that will be showed in the output
  - 1. in the Title box, please type NEM according to Age and Gender
  - 2. in the Caption box, type student data .
- **g.** If the entry is finished, click Continue  $\Rightarrow$  OK
- h. To see the function of Olab Cubes, drag the pointer to student's age or gender from the output result. Then, click two times next to Total until the following picture appears. If the menu option appears in Age and Gender variable, so it can be presented in some input such as the following pictures.

### **Case Processing Summary**

			Cas	ses		
	Inclu	ided	Exclu	uded	To	tal
	Ň	Percent	N	Percent	N	Percent
NEM * AGES * GENDER	30	100.0%	0	0.0%	30	100.0%

### OLAP Cubes

AGES: 21.00

GENDER: Male

	Sum	Mean	N	Minimum	Maximum
NEM	207.90	69.3000	3	68.20	70.40

# 4. PRACTICUM OF CHARTS WITH SPSS

### ------SPSS (Statistic Product and Service Solutions)------

### 1. BAR CHART

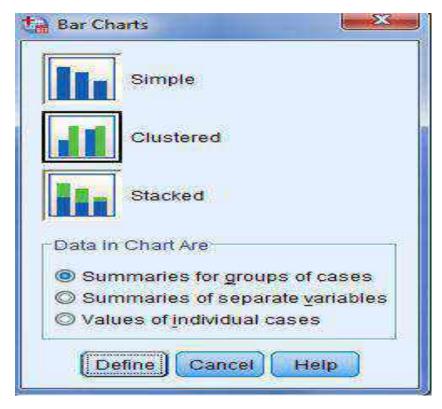
Graphs with bar types (bars) are used to display qualitative data. For example will create a bar graph, which displays the age variable based on gender variables. Means as the X axis is the age variable and as the Y axis is the frequency variable (Field, 2005; Garth, 2008; Singh, Kumar, 2006; Vanlalhriati & Singh, 2015). The steps are:

### a. Open file Data Mahasiswa Baru

### b. click menu Graphs→Legacy dialogs→Bar

484		10	ff			of Technike (3	-		
-	MANIA	GENDER	1694	NEM	Lings or Da	Notes -		line.	t
6	BUILANC	PRA	132	state of the local division of the second seco	AMA			M2-DR#	ľ
f.	DENAR	WANITA	22	48.	C WA			Wire_	
	CADA	MANUA	22	63	4 122011			ALE ASEA	
	CANTINA	WANITA	21	58	2 5946			1 Pm.	
10	CANTRA	TRA	20	56.	0 6840			E Hat-Low.	
11	CANDRA	PRIA	22	47	9 MA			Berchat	Æ
12	CIUTA	WANTA	25	54	2 MA				E
13	CONRO	PRIA	23;	87	MA .			Engrithm.	T
14	DARA	WANITA.	15	69.	3.5%			Population Pyramid	
15	DESI	WANITA	21	62.	) SMU			E geateritiet.	
16	DETA	WANATA.	21	66	3 \$2.5%			Habpan.	ľ
w	128A	PFLA	2.5	40	J SMU				1
18	DANKA	FRA	29	68	2 SMA				
19	DIDN	PRIA	22	56	2 MA				
20	DAMEL	FRA	22	65.	J SMIC				
21	ELIA	WANITA	21	66.	7.5MIC				
22	EIA	WANTA	23	49	5.3MU				
23	F10	PRIA	23	-96.	a swu				
74	FAN	PRIA	23	43	7 MA				
26	G(A)	WANITA	23	67,	I WA				
26	JENY	WANTA.	15	43.	8 MA				
Π.	USA	WANTA	19	63	a statu				
28	ROSE	WANETA.	23	61,	T MA				
79.	MINO	PRA	23	182	S GMH				
20	2000	PRIA	23		D SMR				
- 10		2002			12200	_			ī

After doing a step like the above, the result will appear as follows :



On the menu Bar Chart : klik clustered  $\rightarrow$  Summaries for Groups of Cases $\rightarrow$ Define. So

that the following picture will appear as follows:

	Bara Rispressett		Tan
STATIANA 2 NEM	O M of cause	🐡 🐜 of cueso	Doots
ASAL	C Gum N	O Cum S	
add London	O Other etablistic to g., i	mean)	
	and a summaries	-6.9	
	SHE C	1	
	M CONTRACTOR OF	We constitute 1	
	L'Enun	We small the 1	
	Category Asia		
	CONTRACTION A		
	Dofine Clusters	28.	
	di GENDER		
	P Parvet by		
	Rows		
	NOT A SHORE SHOW SHOW SHOW SHOW SHOW SHOW SHOW SHOW	an low artight forms	
	Columns	and there should be coming a	
		en (mentigiscophettine).	
Template			
Use chait speci	fications from:		
CUL			
Cardine .			
114	OK   Paste   Beset C	the second of the second se	

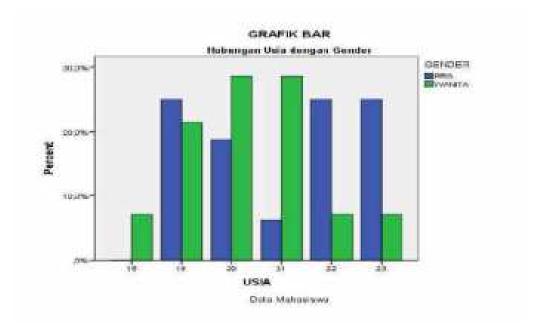
c. In the display

### of Define Clustered Bar :

- i. choose % of cases.
- ii. Click variable AGE and drag to the Category Axis.
- iii. Click variable **GENDER** dan drag ke **Define Cluster by.**
- d. Click menu **Titles**, so the display will be appear as follows:

Linedi		_
Line 1:	GRAFIK BAR	
Line 2:		-
<u>S</u> ubtitle: Footnote	Hubungan Usia dengan Gender	
Footnote		

- i. On the **chart Title. Line 1**, type : GRAFIK BAR
- ii. Then on the **chart Subtitle**, type : Relation AGE and Gender.
- iii. On the chart Footnote. Line 1, type : DATA MAHASISWA
- iv. Click menu Continue
- e. Finally click **OK** if the entry has been complete and the result is as follows :



### 2. HISTOGRAM

A histogram is a Bar type graph that is used to describe a frequency distribution. The histogram is also used to see if the data is normally distributed or not. For example, it will create a Histogram graph for the distribution of the SCORE variable along with its normal curve. The steps are as follows:

- a. Open file Data Mahasiswa Baru
- b. Click menu Graphs→Legacy dialogs→Histogram

244			· ·	in all	all Grunt Baltiter. Bill Gruptenant Campiete Levenant.	
	- name	I ISTIMUT	LIENS I	442.54	The second se	and the second s
ţ	Industry Advances	CTUA.			1 IAA	100 24/Ste
1	Through Str.	NUMBER OF	22	4.5.4	a solu-	Martin .
a	Internation.	MARKET IN	398	9.85	Childe	- 452 3+++
	TABLE INC.	Southing State	26		1 Multie	THE PLAT
10.	Levela .	PPELAN.	10	***	n (54%)	THE HAR LOW.
1.11	THE REPORT	AM10	0.00	4.4.4	a auto	E thereine
1	COASE A.	WAARTA.	28	64.5	2.105	
(3)	- DOMAGE	PHIA.	23	437	<	and self-mail
10.	COMPANY.	200.0048.120	318	84.3	E MARK	202 President of grants
100 C	ALL	WAREIA	28	61.0	3.10746.)	- Bartester
10	The Date.	MANETA:	69	64.5	3 (WAN)	and the strategy of the
110	ENAM:	WWW.	507	663	3 39/412	the second s
100.	Landstone	4440.00	304	44.3	2 MAA	
10	THEFT	319123.	100	91.7	7 84A	
10	Tanger:	1000	20	62.3	1. Dente	
11	10.5 (44)	WARTS.	21	44.3	7 39/04	
	7.94	WOARTS.	20	43.0	N OWICI	
10.	17.64	9444	27 (B) (B)	84.4	e (News)	
10.	7.000	WHERE .	11	6.0.7	P daute.	
10	-C2-A	MARKEN.	7.8	47.	1 Martin	
in .	ACM'S	VILLIET 6		43.0	6.600	
er .	1,1954	MARKET	28	83.5	a monut	
24	Photod:	WARTS.	38	44.7	T BAA	
200 200	NHIO.	270.08	23	0.5	C CYVIII	
10	and do	44444A	3.6		Y Man	

in strange.

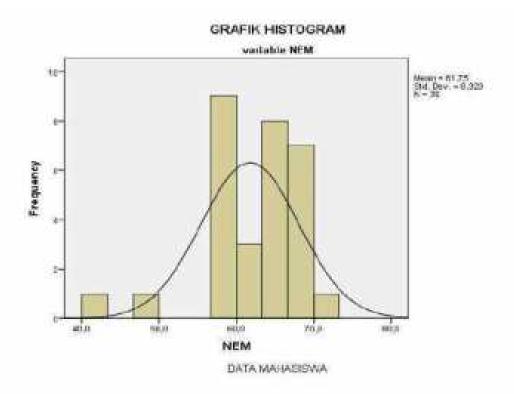
After doing a step like the above, the following picture will appear as follows:

an MARA	Vanable.	
CENDER USIA	Display sormal curve	
ASAL	Pared by Roys:	
	Theytmanathic (no employment) Columns	
Carrier and the second	High School of the School of t	may
Tenulate Turus chart specif	ications from:	
-	OK Pasts Resul Carcal Holp	

- c. On the display of **Histogram** : click **variable SCORE** and drag to the **variable** box.
- d. Click menu **Titles**, so the display will be appear as follows:

Title	
Line 1:	GRAFIK HISTOGRAM
Line 2:	4
Subtitle:	variable NEM
Footnote	1
Line <u>1</u> :	DATA MAHASISWA
Line 2:	

- i. On the chart Title. Line 1, type : GRAFIK HISTOGRAM
- ii. On the **chart Subtitle**, type : SCORE Variable
- iii. On the chart Footnote. Line 1, type : DATA MAHASISWA
- iv. Click menu continue
- e. Finally click **OK** if the entry has been complete and the result is as follows :



### **3. PIE CHART**

Graphs circle or pie chart is used to show the qualitative data. The composition of pie chart is expressed in percentage. For example, I will make a pie chart to see the composition of age variable. The steps are as follow:

- a. Open the data New Students/data mahasiswa baru
- b. Click menu Graphs  $\rightarrow$  Legacy dialogs  $\rightarrow$  Pie

				Gauteca	dell. 15 Nemphale Chocoell.		1116
64.	3	(8)		Latable		III SM	
	ANA	COMPANY	USA.		Colorest and		
£	ENTANG-	P984		52.8 MA		U pose.	and a second
1	EDIAR:	WANTER,	- 22	60,410,6		Without and	
A	CACA	WARDER	10	10.4 595		Ra free	
9	CANTERA	WARITA	21	58,2 SMH		MIPH.	
10	CANRA	PY8A.	20	M.S.SUL		With Low.	
11	CANDEA.	PT0A.	- 72	SUS MA		We Bergan	
12 1	CINTA	WANTA .	10	84.7 NA		A CARDON STATE OF THE OWNER OWNER OF THE OWNER OWNER OF THE OWNER OWN	
13	COKRO	PRA	23	47.1 MA		Erge Bar	
14	DARA	WARETA	-19	CO SAN		Fusdation Promit.	
	0110	WARETA	13	62,3-09/8,7		Ecoter/Ov!	
15	DETA	WARETA	21	RET SMAL		alle Histopane.	
17	OKA	PRM.	12	67,117/R/		- Internet and the second s	
10	DANAL	PRM.	13	66.2 SMA			
11	CNOW:	ASTA	- 52	SG/IMA			
21	OAMEL	19395	12	61,3.52,94			
21	ELM	MARITA	24	88.7 SUN			
22	EA	WANITA .	20	43.5 57.8.			
11	100	PIGA	-20	55.5 (St.A.)			
N.	INAM .	IPRA	11	ELT MA			
8	QA.	WARETA	B	67,1 MA			
N	JOHN .	WARUETA	19	K2.5 MA			
31	LESA	WARLESA.	12	61.1.574.1			
M	ROSE	WANITA	10	<b>BUT MA</b>			
29	MID	PRM	B	42.6 52/60			
10	1200	PROL	10	67.3 SP/H			
	11						

PW.

After doing the step, the results will appear as follows

<ul> <li>Data in Chart Are</li> <li>Summaries for groups of cases</li> <li>Summaries of separate variables</li> </ul>
hannananananananananananananananananana
O Summaries of separate variables
O Values of individual cases

**c.** On the step forward like above, choose **Summaries for group of cases**, and then click **define**. So it will appear like the following picture :

GENDER NEM ASAL	Slices Reprocent O N of cases O Sum of variable Variable	<u>Titica</u> Options
	Define Slices by:	
	Columns:	
Template	Ications from.	

### d. On the menu Define Pie Summaries for Groups of cases :

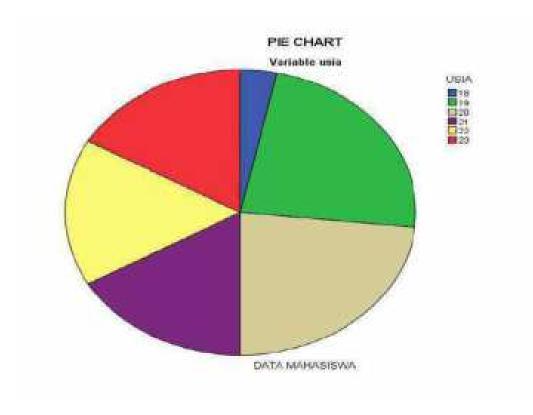
- i. Click% of cases
- ii. Click AGE variable and drag into Define slices by
- iii. Click menu **Titles**, until the following picture appears as follows:

Titles		
Line 1:	PIE CHART	1
Line 2:		
Subtitle:	Variable usia	
Line <u>1</u> :	DATA MAHASISWA	Ĩ
Line <u>2</u> :		
	Continue Cancel Help	

e. On the menu **Titles** :

- i. On the Chart Title. Line 1, type : PIE CHART
- ii. On the Chart Subtitle, type : Age Variable
- iii. On the Chart Footnote. Line 1, type : The Data Students
- iv. Click menu Continue

f. After that, click  $\mathbf{OK}$  if the entry has been complete and the result is as follows :



4. LINE CHART

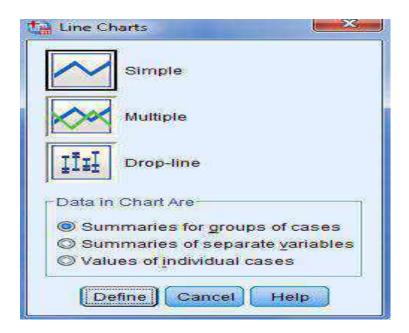
Graphic Line Chart with lines is used to show the qualitative data. For example it is used to make a chart line, namely **SCORE variable.** It means as X axis it is frequency variable and as Y axis is NEM variable. The steps are as follows:

### a. Open file The Data of New Students

### b. Click menu Graphs $\rightarrow$ Legacy dialogs $\rightarrow$ Line

					B gentäuner		2 🖬 📲 🤇	6	15	
404.	Palanta -	0-2029			Lapury Dianga	10	The second	-	_	
6	(INTATA)	PRA	USA.	NEN I	ADAL NO		HIDORN.	-	10	-
7	TENAS	1WARDA	12		L'AN-		El Line.			
	CACE.	WABSIA	20		a swi	_	10 grs.			
5	CARENA	WANTA	23	1.00	2.5VK		Mine-			
10	CANTLA	1755A			1 DAY		and the second			
11	CANDRA	FRA	223		1 100		HE THE LOW			
12	CARGANA CONTRA	WANTA	22		2.84		Bigid.			-
13	COKRO	PRIA	23		114		Bergram.			
34	DARA	Matria	18	100 million 100	3 BVK		The Interation Provend			
15	LOCIN	WANTA	21		3/390		Sale Dil.	-		-
14	OTA	WANTA	21		1.57K		HILITING .			
- 10	DRA DRA	Pisa	12		1.54% 1.54%	_	Ma Handana	1.00		
10	DAMAR	DOM	11		2.684					
12	DINCH	PRA	22		7.5%				_	
				1.177						
20	DANEL	PRA	11		3.84%			_		_
21	11.34	INAME A	21		7 588					
22	FIA	WARTA	28		5.840					-
13-	THE	PRIA			1 BHU					
24	FIAN	. FRA	21		7.604					
28	CAA:	WARTA	22		C-894					
21	ENY	MANETA	18		1.114					
27	1154	WANTA	19		E GVU					_
21	HOOL	WANDA	29		7.866					
28	1010	PBA	3		S NINK					
-	203	198A	23		1.54%	-			_	
-	11/20									

After the entry has already been done, the following picture will appear:



c. On the menu Line Chart: choose the graph Simple →Summaries for groups of cases→ Define. Until the following picture appears:

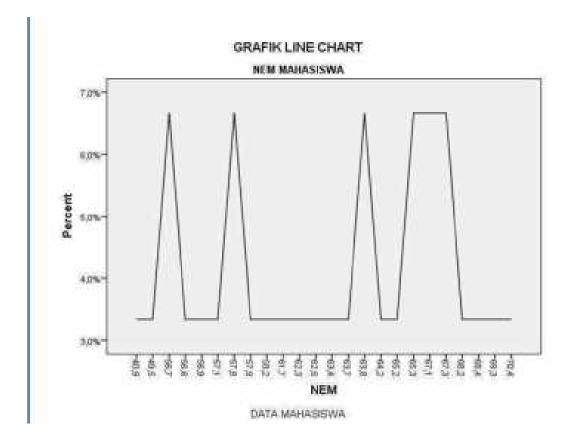
da NAMA	Che Reportants IS to or cases IS to or cases IS to or cases	and states
OBA	@ gunt N @ Gugs N	
ADAL	O Other glatiche (e.g. maans	
	Carrier Carrier	
	COLORIS (BLACK)	
	Category Agia	
	Page by Rows	
	Courses	
	Transford ables (we sensity controlled)	
Systematics	Ications from	
1 Tan		

- d. On the menu **Define Simple Line**:
  - i. Click % of Cases
  - ii. Click SCORE variable and drag into Axis category
  - iii. Click **Titles** and will appear look as follows :

Title	GRAFIK LINE CHART	
Line 2:		
Subtitle:	NEM MAHASISWA	-
- Footnote		
3		1
Line <u>1</u> :	DATA MAHASISWA	
Line <u>2</u> :		30

- e. On menu Titles:
  - i. On the **Chart Title. Line 1,**type : LINE CHART
  - ii. On the **Chart Subtitle**, type : SCORE Variable
  - iii. On the Chart Footnote. Line 1, type : The DATA STUDENTS
  - iv. Click menu continue

f. After that click **OK** if the entry has been complete and the result is as follows :



# 5. PRACTICUM OF CREATING A STATISTIC TABLE WITH SPSS

In testing a hypothesis using t test, F or Chi Square sometimes it requires statistical table (Everitt & Skrondal, 2006; Field, 2005; Jackson, 2009; Rusydi & Fadhli, 2018). SPSS as a statistical software is not equipped with the ability to create statistics tables directly, but it is still possible to create a statistical table through the menu TRANSFORM. in practice this will be practiced how to create 3 table statistics namely t table, F table and Chi Square table.

### 1. t Table

To create t table , the first is to determine: degrees of freedom (df) and the amount of significance level ( $\alpha$ ). And the steps are as follows:

- a. determine the degree of freedom (df) that is going to be made, eg 5,6,7,8, ... 30. The writing of degrees of freedom (df) in SPSS is sequentially down (column) and name the variable with df.
- b. determine the level of significance ( $\alpha$ ) eg: 95%, so  $\alpha = (100-95)\% = 5\%$
- c. from the SPSS main menu, open the Transform menu → Computer Variable ... so the Compute Variable dialog box appears as follows:

		-	4	Constr Funkte		-		100000
Ľ		_		Contraction and the second			78.95	10352
_	- i -	EF.	Territoria	Nergy Bonistit:				ar
1	1	2.05	13	<ul> <li>(11) (10) (10)</li> </ul>			_1_	
1		394	(Inst past					
1		18		- 1				
	1	18	80	*				
	1	181	alies		Fundion geogr			
_		181			Cenercles .			_
	1	187			Content Date/lime Date with metry			
	11	17			Den Cratita			_
	13	12			Oue Smither			
	14	1,76			IVerte DE			
1	15	12		11 (A. ) I	Bersteinen an			_
9	16	酒			Fortow and Parity Instance			
٥	1.	1.78		- () DVM +	a gast			
	11	5,73		10 Test it Reven from tendator Soleda :	Inf.amin			
5	19	172		definition with standard degrees of insection of the wind	let laomit			
6	31	177		Reconciste presidity a pro-	Churgen.			
7.5	21	tite:			differiti			
1	12	175	Tarberd size or		(d)md			
5	21	5,75		_1()	ut live pi			
8	31	1,75		- W41 44 17-	d him			
	15	101		areas and a	Id Xeb.			
2	36	1,71	-	Contraction of Contraction Contraction				
9	27	575		CK Burn Burnt Canal Here				
		1.75		and the second				_

- d. in the **target variable** box, fill in: t\_5 (place / column to accommodate the calculation result)
- e. in the Function group box, click (choose): Inverse DF
- f. in the Function and Special Variables box, click (choose): ldf.T and click the up arrow button so that it goes into the Numeric Expression box:
- g. fill in the brackets (?,?) with (0.95, df), then click OK, so that in the data view it will appear the following results:

100	自馬		2 F	計画	af.	16 F		<b>三</b> 心:	1.04	39	15				
	3	_	-			_			_	-	_	_	_		10.0013 (13)
		15	3.25	19493	1.000		1	1.19	HISTORY !!		100	1	98	1.141	1
	E	242	6,67												
		8,64	14												
	2	149	2.35												
	<u>F</u>	186	2.31												
1	1	1.01	2.25												
	- 11	1,11	1.0												
	11	131	238												
	10.	1.10	2.90												
	11	1.17	2.8												
	- 14	1,18	2,84												
1	15	1.75	2.03												
3	1.16	1,15	2,52												
9	12	1.74	2.92												
ù l	- 11	1,71	2,00												
1	10	1.73	2,05												
6	20	1,72	1,00												
2	25	1.72	2.08												
1	12	13	1.07												
5	23	1.71	2.07												
	. N.	1.71	2.08												
1	8	1.11	205												
2.00	15	1,11	2.00												
1		1.78	2.65												
	N	118	1.00												
-								-					_	_	

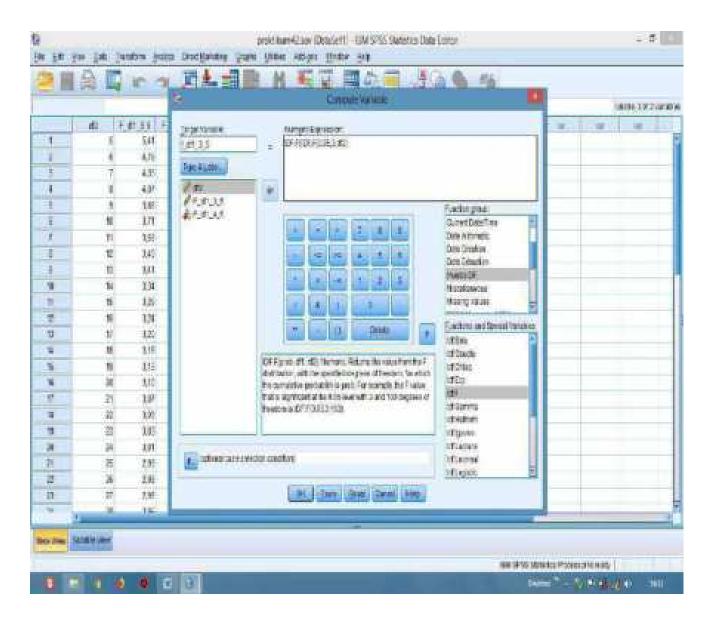
h. the above table is for one-sided test, eg t value (0.95; 10) = 1.81 but for two-sided test the value of t (0.95; 10) = 2.23

### 2. F Table

To make F table , it needs 2 (two) degrees of freedom (df) that is **DF1** (numerator) and **DF2** (denominator / denominator) and level of significance ( $\alpha$ ). Because SPSS can not do calculations for two dimensions, then to create table F, DF1 is made constant. The steps are as follows:

- a. Determine the degree of freedom for DF1, for example 3 and 4.
- b. The variable name for DF1 (numerator) is F\_df1\_3 for df = 3 and F\_df1\_4 for df = 4.
- c. While the degrees of freedom for DF2 (denominator) is: 5,6,7,8 ..... 30.
- d. The writing of degrees of freedom **DF2** is sequentially down (column) and the given name is **df2**.
- e. Determine the level of significance ( $\alpha$ ), eg: 95%, so  $\alpha = (100-95)\% = 5\%$ .
- f. From the SPSS main menu, open **Transform**  $\rightarrow$  **Compute Variable** so that the

**Compute Variable dialog** box appears as follows:



- g. in the Target Variable box, fill in F\_df1\_3\_5 (place / column to accommodate the calculation result).
- h. In the Function group box, click (choose): Inverse DF
- i. In the **Function and Special Variables** box, click (choose): **Idf.F** and click the up arrow button to move to the **Numeric Expression** box
- j. Fill in parenthesis (?,?,?) with (0.95,3,df2) and then click OK, so that in Data View will appear result in column F\_df1\_3\_5 like the following:
- k. In the same way for df = 4 on DF1, ie (0.95,4, df2) will appear the result in column

F\_df1\_4\_5.

		in a		h₫		h •	一		99	-56					
				111-00									3	in the life li	Vite
	æ	nn is n	11.4.5	-	- 19	- 14	 - 101		1.00	1	- 14	-14	- 10	-	
1	t	1/1	8,9												
1		2,28	1,83												
	- T/	435	1.0												
4	1	422	-14												
		2,08	- 38												
	- N.	1,11	1,40												
1	1	1,59	1.16												
1	11	2,43	3.35												
.1	12	2,41	1.9												
12	14	3,34	1.11												
1	H.	1,29	3.65												
10	11	1,24													
0	17	124	2,6												
214	11	1.15	1.82												
.12	8	2,12	2.0												
	2.	1,99	1.17												
17	2	1.17	2.84												
-	27	3,25	2.8												
	Ŧ	2,03	2.62												
31	2	121	1,75												
21	24	2,85	2.26												
-	X	2,38	1.74												
5 B	25	235	221												
	2	194	2.0		_		_	_	_	_					þ
inte surve	NOTION THE						-								

1. How to read table F for 95% significance level ( $\alpha$ ) with df1 = 3 and df2 = 10 then the value of F Table is 3.71 but for df1 = 4 the value of F table is 3.48.

#### 3. Chi Square Table

To create a Chi-Square table in need of degrees of freedom (df) and level of significance ( $\alpha$ ), the steps are as follows:

- a. Determine the degree of freedom (df) that is going to be made, eg 1,2,3,4,5,6,7,8 ....
  30. The writing of degrees of freedom (df) in SPSS is sequentially down (column) and the name of variable is df.
- b. Make a df variable to accomodate the degrees of freedom by writing the numbers
   1,2,3,4,5,6,7,8 .... 30 sequentially down (column)
- c. Determine the level of significance ( $\alpha$ ), for example 5%
- d. Make a chi\_5 variable to accomodate the result / value of Chi-Square with  $\alpha = 5\%$
- e. From the SPSS main menu, open Transform → Compute Variable menu .. so the Compute Variable dialog box appears as follows:

-			<b>F1</b>		1				
_				TOURNEY				Techne 2 with	i'n n
	4	d 5	jarge(Vallatie	Nurget: Expression		(a)	T	ন্ম	
1		34	\$15.	CFC+6592.75.45			i		
2	2	ER:	Tes Start			_			
3	3	7,61		- (****)					
4	4	149	ch 5	*		1			
5	5	91,07	1 cit 5	1	Findra groe				
6	6	经持			Osenibile/Tre	_			
1	7	14.07			Date Astronatic	1			
0	1	15,51		- m or 4 5 ft	Date Creation Date Estactuat				
9	3	15,52			Invena DF				
0	1			1 2 5	Bipolonia.				
					Masing Values	1			
12					Parallel and Parallel and				
11				() Didb +	Randone and Special Visitables				
11 II					BCasty			1000	
				ICF CHSCard, di Nuevelli. Retaria de selve formite	HOW	1			
6				chi-square domination with the specified degrees of the extent of, for which the same adve protocolidy is prot. For	t#Eip				
17				energie be monaise al antidis significant attention	ldF		-		
				level with 3 degrees of the carrier DF CH80(C351).	ld Calenta Id Raftern				T
6					tillgants'			1	
1					til Laplace	-			
	-		Tations inse p	Adaricatilar)	tellisormal	-			
					Hillighte I		100		
IJ				()* (34) (588 (200) (44)				-	-
10.000						-	1		
1							_		

- f. In the Target Variable box, fill in: chi\_5 (place / column to accommodate the calculation result)
- g. In the Function group box, click (choose): Inverse DF

- h. In the **Functions and Special Variables** box, click (choose): **Idf.Chisq** and click on the up arrow button so that it moves to the **Numeric Expression** box
- i. Fill in parenthesis (?,?) with (0.95, df) and then click **OK**, so in the **Data View** will appear the results in column **chi\_5** like the following:

	A [	100				n."		10 A	1.10	100	1000				
														1000.24	
		- 402	1.04			1.000	1. 140		1.00		Citer -		10	 1.000	
-		2.84			_	_		_			_			 _	
	2	6.89												-	
1.	7	7,81													
- 11-	4	848													
	5	-187													
	6	7.00													
	1	14.47													
17		15.88													
		75.39													
	-														
				_	_	_						_			-
												-	_	_	-

j. How to read the **Chi-square Table** for a 95% significance level ( $\alpha$ ) with df = 9 is that the Ch-Square value is **16.92**.

### 6. PRACTICUM OF NORMALITY TEST

### **1.PURPOSE**

To test whether the data comes from the population which has normal distribution (Friedrich et al., 2017; Kim et al., 2018; Ostertagová & Ostertag, 2013; Solutions, 1918).

#### 2. DATA

The following final project data is from English Education Department student "Danu Bimantara" entitled "Experimentation of English learning through Contextual Approach with Adjusted Games to Improve Students Reading Skills reviewed from Students' Learning Style Preference in SMA N 3 SEMARANG". The aim of the research is to show whether : a) There is a difference between English learning achievements of the students who follow the learning process t

hrough Contextual Approach with Adjusted Games with students who follow learning through conventional methods, b) There is a difference of the effect of the students' learning style on their learning achievements in reading skills.

No	Ques	tionnaire	Pre	Test	Pos	t Test
	Control	Experiment	Control	Experiment	Control	Experiment
1	А	K	66	76	91	69
2	Κ	V	65	78	76	65
3	А	V	75	69	87	92
4	V	V	75	67	72	85
5	V	A	87	71	68	58
6	Κ	A	82	74	61	69
7	V	Α	84	81	57	73
8	V	V	66	67	68	81
9	K	Α	70	73	68	73
10	Κ	K	70	73	49	77
11	А	V	74	65	76	92
12	А	K	64	68	53	54
13	А	V	67	65	80	69
14	K	K	79	65	57	62

15	А	K	79	78	76	54
16	Κ	V	80	79	57	77
17	V	Α	77	69	64	85
18	А	K	73	70	64	81
19	А	Α	71	74	72	65
20	А	V	72	71	64	62
21	K	А	80	70	49	58
22	V	А	92	75	61	77
23	K	V	75	68	68	72
24	V	V	78	80	53	81
25	V	V	75	61	76	96
26	А	Α	66	73	80	85
27	А	Α	70	69	76	69
28	Κ	K	84	90	61	65
29	V	K	77	79	80	69
30	Κ	K	62	73	57	81
31	V	K	91	73	53	69
32	K	V	76	82	49	73
33	А	А	80	63	61	69
34	V	V	77	71	64	85
35	V		80		57	
36	V		73		72	

Note: A (Auditorial); V (Visual); K (Kinesthetic)

### **3. PROBLEM/CASE**

Will be tested whether the value of the data in the control class comes from the normally distributed population.

### 4. HIPOTHESIS

 $H_0$ : The sample in the control class comes from the normally distributed population.

 $H_{1:}$  Samples in the control class does not come from the normally distributed population.

### **5. BASIC DECISION-MAKING**

Based on significance value (Probability)

 $H_0$  is accepted if sig value > 0.05

 $H_0$  is rejected if sig value < 0.05

### 6. CALCULATION WITH SPSS

- a. choose menu Analyze, Descriptive Statistics, Explore
- b. after the normality test dialog box appears, then select the initial test score data in control class and experiment class as dependent list, click plots button, select *normality test with plots* and click continue *OK*.
- c. output result:

Case Processing Summary								
		Cases						
	Va	lid	Mis	sing	Total			
	N	Percent	Ν	Percent	N	Percent		
PreTestControl	36	100.0%	0	0.0%	36	100.0%		
PreTestExperiment	36	100.0%	0	0.0%	36	100.0%		

	Descriptive	es		
			Statistic	Std. Error
	Mean		75.33	1.214
	95% Confidence Interval for	Lower Bound	72.87	
	Mean	Upper Bound	77.80	
	5% Trimmed Mean		75.12	
	Median		75.00	
	Variance		53.029	
PreTestControl	Std. Deviation		7.282	
	Minimum		62	
	Maximum		92	
	Range		30	
	Interquartile Range		10	
	Skewness		.286	.393
	Kurtosis		120	.768
	Mean		72.69	1.023
	95% Confidence Interval for	Lower Bound	70.62	
PreTestExperiment	Mean	Upper Bound	74.77	
r re restExperiment	5% Trimmed Mean		72.53	
	Median		73.00	
	Variance		37.647	

	•	
Std. Deviation	6.136	
Minimum	61	
Maximum	90	
Range	29	
Interquartile Range	10	
Skewness	.474	.393
Kurtosis	.427	.768

Tests of Normality

	Kolm	nogorov-Smir	nov <sup>a</sup>		Shapiro-Wilk				
	Statistic	df	Sig.	Statistic	df	Sig.			
PreTestControl	.094	36	.200*	.976	36	.626			
PreTestExperiment	.091	36	.200*	.977	36	.648			

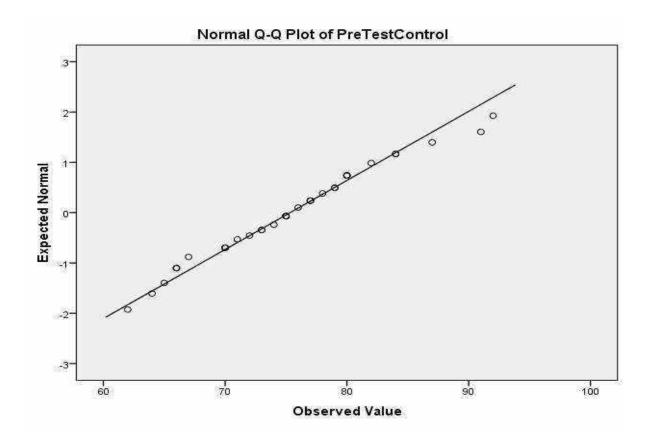
\*. This is a lower bound of the true significance.

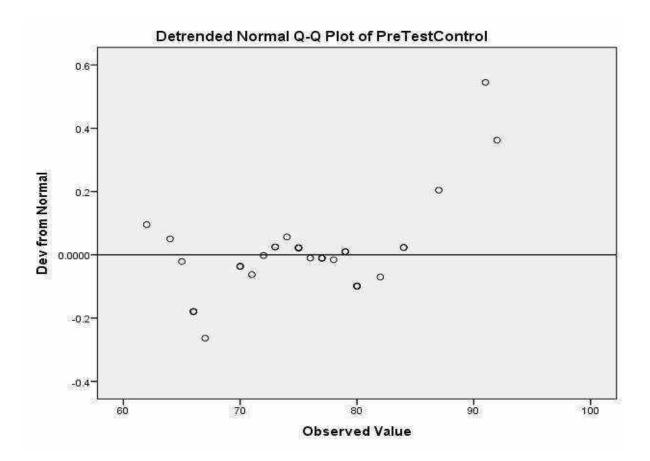
a. Lilliefors Significance Correction

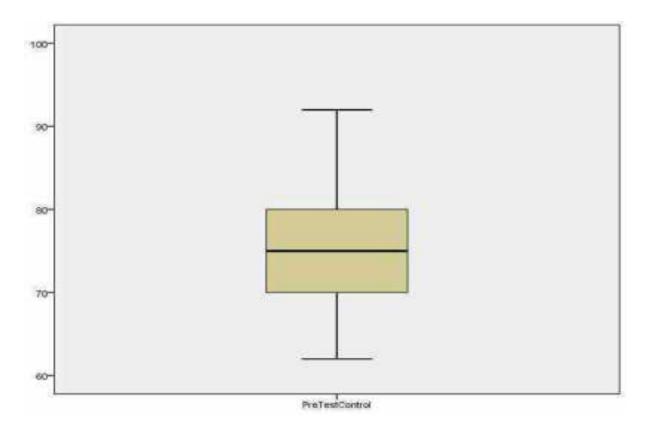
## PreTestControl

PreTestControl Stem-and-Leaf Plot

Frequency	Stem &	Leaf
2,00	6.	24
5,00	6.	56667
8,00	7.	00012334
11,00	7.	55556777899
7,00	8.	0000244
1,00	8.	7
2,00	9.	12
Stem width:		10
Each leaf:	1 0	case(s)



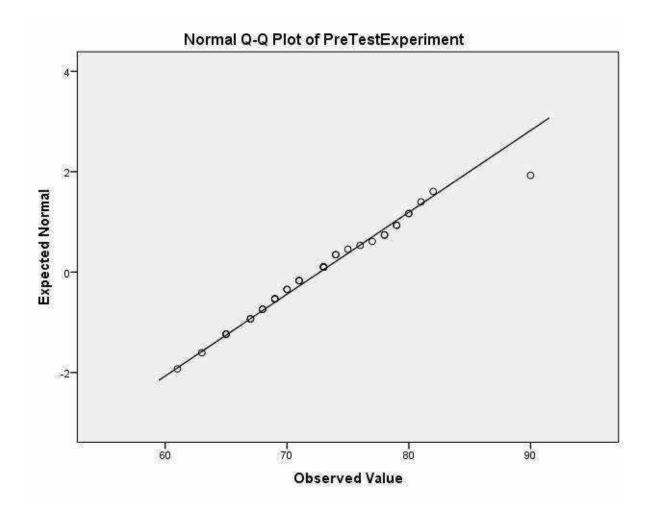


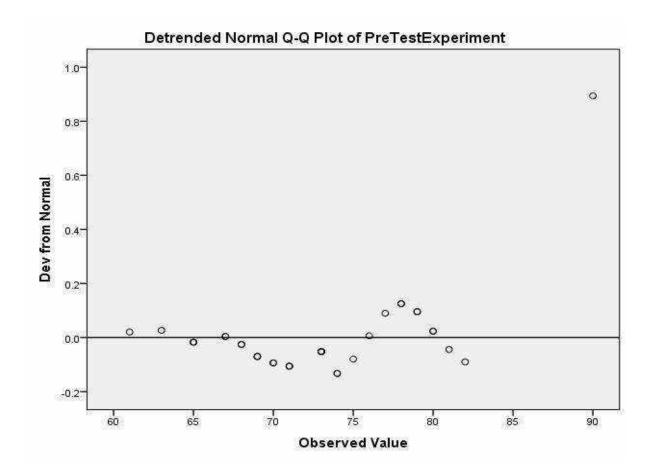


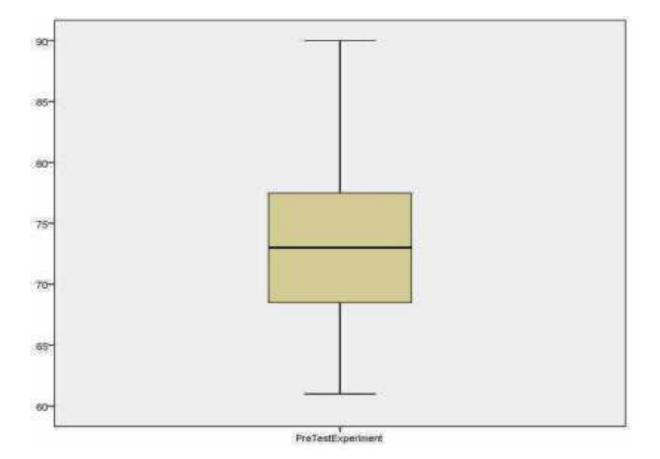
## PreTestExperiment

PreTestExperiment Stem-and-Leaf Plot

Frequency	Stem &	Leaf
2,00 10,00	6. 6.	13 5557788999
12,00		001113333344
7,00		5678899
4,00	8.	0012
,00	8.	0
1,00	9.	0
Stem width: Each leaf:	1 1 c	0 ase(s)







#### 7. THE TEST DECISION

Based on the sig value in the *test of normality* table, it is obtained that the sig value at the pre test of the control class (control 1) is 0.626 and the post test of the control class is (control 2) 0.290, because 0.626 > 0.05 and 0.290 > 0.05 so, H<sub>0</sub> is **ACCEPTED**.

#### 8. CONCLUSION

The sample in the control class comes from the normally distributed population.

### **PRACTICUM 5 DATA**

The source of data from:.....

No	Pre	Test	Post Test				
	Control	Eksperiment	Control	Eksperiment			

### 7. PRACTICE OFHOMOGENEITY TEST

### **SPSS (Statistical Product and Service Solutions)**

#### 1. PURPOSE

To show that two or more sample of data of groups come from the same populations or variance (homogeneous) (Friedrich et al., 2017; Rusydi & Fadhli, 2018; Singh, Kumar, 2006; Singpurwalla & Lai, 2020).

#### 2. DATA

No	No Pre Test		Pos	t Test
	Control	Experiment	Control	Experiment
1	66	76	91	69
2	65	78	76	65
3	75	69	87	92
4	75	67	72	85
5	87	71	68	58
6	82	74	61	69
7	84	81	57	73
8	66	67	68	81
9	70	73	68	73
10	70	73	49	77
11	74	65	76	92
12	64	68	53	54
13	67	65	80	69
14	79	65	57	62
15	79	78	76	54
16	80	79	57	77
17	77 69	77 69 6	64	85
18	73	70	64	81

19	71	74	72	65
20	72	71	64	62
21	80	70	49	58
22	92	75	61	77
23	75	68	68	72
24	78	80	53	81
25	75	61	76	96
26	66	73	80	85
27	70	69	76	69
28	84	90	61	65
29	77	79	80	69
30	62	73	57	81
31	91	73	53	69
32	76	82	49	73
33	80	63	61	69
34	77	71	64	85
35	80		57	
36	73		72	

#### 3. PROBLEM/CASE

In this case, the researcher will test whether the score of the data in the control class and the experimental class have the same variance (homogeneous).

#### a. HYPOTHESIS

Ho:  $\delta^2_{Kontrol} = \delta^2_{Eksp}$ 

H<sub>1</sub>:  $\delta^2_{Kontrol} \neq \delta^2_{Eksp}$ 

#### **b. BASIC DECISION-MAKING**

Based on the value of significance (probability)

 $H_0$  is accepted if the value sig. > 0.05

 $H_0$  is rejected if the value sig. < 0.05

#### 4. CALCULATION WITH SPSS

- a. Open the data file that is going to be analyzed
- b. Copy the data of pre-test of the control class and the experiment class into the SPSS worksheet, put it in one column and keep in mind the serial number 1-36 are control class and 37-70 experiment class, then in the second column the contents with "1" to control class and "2" to experiment class.
- c. Create variable names by way of variable view, then on the label column name the "Contextual Approach" on VAR000001 and "Learning Style" on VAR000002
- d. Then in the value column on VAR000002 click none until a dialog box appear
- e. Fill in the value coloumn with "1", label with "Control" than Add, then with "2", label with "Experiment" than click Add and click OK
- f. Do the homogeneity test with *Lavene Statistic* test by selecting the menu:  $Analyze \rightarrow compare\ means \rightarrow one-way\ anova.$
- g. Input "Contextual Approach" to the box Dependent list and "Learning Style" to the box Factor.
- h. Click menu Option and choose *Homogeneity of variance test*, then click
   Continue.
- i. Then click **OK** so the result will appear (output).

#### **Test of Homogenity of Variances**

Contextual Approach

Levence							
Statistics		df1		df2		Sig.	
	.867		1		68		.355 -

#### 5. TEST DECISION

Based on the results of the table *Test of Homogeneity of Variances* table it is obtained sig. value = 0.355, because of sig. value 0/355 > 0.005 so H<sub>0</sub> is ACCEPTED.

#### 6. CONCLUSION

The variance of the population in the control class and the experimental class is the same (homogeneous).

### 8. SPSS Test on One Sample t-test

#### **One sample t test fundamental concepts**

1. The one-sample t test is also known as the t test for one sample.

2. The purpose of the one-sample t test is to compare the average of the sample under study with the average of the existing population.

3. One sample t test can also be used to test hypotheses in descriptive statistics.

4. One sample t test is part of parametric statistics. Therefore, the basic assumption that must be met is that the research data must distribute normally (Ave, 1999; Chakrabarty, 2018; Cicchitelli, 1989; Copyright & Companies, 2010; Friedrich et al., 2017; Garth, 2008; Ostertagová & Ostertag, 2013; Parthiban & Gajivaradhan, 2016).

#### **ONE SAMPLE t TEST EXAMPLE**

A researcher made a conjecture stating that "the average score of student learning outcomes in Speaking for Academic Purposes Course who are active in English Community Club is equal to 80".

To prove this, the researcher chose randomly 12 students who were active in English Community Club.

The average score of the learning outcomes of the 12 students is as follows.

NO.	AVERAGE LEARNING RESULTS
1	79,2
2	75,6
3	81,4
4	82,3
5	76
6	76,7
7	74,4
8	84,4
9	77,4
10	74,8
11	82,6
12	78

#### CATATAN:

Data is the average score of student report book in the midterm 1 test (UTS)

#### **RESEARCH DATA ANALYSIS WITH SPSS**

- 1. Conduct a normality test to find out whether the average score of student learning outcomes in Speakin for Specific Purposes who are active in English Community Club is normally distributed or not as a requirement for one sample t test in Parametric Statistics.
- 2. Perform a one sample t test.
- 3. ANALYSIS STAGE

```
INPUT -->ANALYSIS -->OUTPUT
```

#### **DECISION BASED ON NORMALITY TEST**

If the sig. value > 0.05, the data distribute normally.

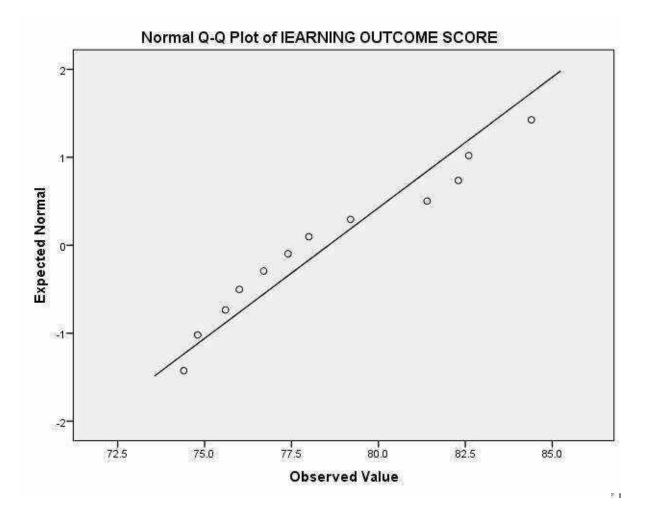
If the value of sig. < 0.05, then the data do not distribute normally.

#### **Tests of Normality**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Statistic df Sig. Statistic df				Sig.
IEARNING OUTCOME	.150	12	.200*	.926	12	.337
SCORE						

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction



#### **RESEARCH HYPOTHESIS**

H0 = The average score of student learning outcomes who are active in English Community Club is the same as 80.

Ha = The average score of student learning outcomes who are active in English is not the same as 80.

#### ONE SAMPLE t TEST TEST BASIC DECISIONS

The basis for decision making in the one sample t test can be done in 3 ways:

- 1. Comparing the value of Sig (2-tailed) with 0.05.
- 2. Comparing the value of tcount with ttable.
- 3. Look at the comparison of the value of tcount with ttable with a curve.

#### **1. BASIC DECISIONS BASED ON SIG VALUE**

If the value of Sig. (2-tailed) < 0.05, then H0 is rejected.

If the value of Sig. (2-tailed) > 0.05, then H0 is accepted.

Decision: Due to the value of Sig. (2-tailed) of 0.168 > 0.05, then according to the basis of decision making above, H0 is accepted. Thus, it can be interpreted that the average score of the English learning outcomes of students who are active in English Community Club is 80.

		0	ne-Sample Tes	t				
		Test Value = 80						
	t	df	Sig. (2- tailed)	Mean Difference	95% Confidence Interval of the Difference			
					Lower	Upper		
IEARNING OUTCOME SCORE	-1.474	11	.168	-1.4333	-3.573	.706		

If the value of tcount > ttable, then H0 is rejected.

If the value of tcount < ttable, then H0 is accepted.

Decision: Because the tcount is -1.474 < ttable 2,201, then H0 is accepted. So it can be concluded that the average score of student English learning outcomes who are active in English Community club is 80.

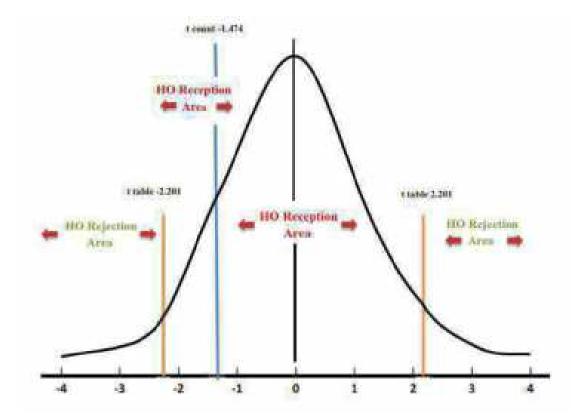
Formula to find t-table

= 0.05/2; df

=(0.025;11)

Then look at the distribution of statistical t-table values. It is found that the t-table value is 2.201

#### **3. BASIC DECISIONS BASED ON THE CURVE**



Based on the curve above, it can be concluded that H0 is accepted. So it can be interpreted that the average score of student English learning outcomes who are active in English Community Club is not the same as the score of 80.

One-Sample Statistics							
	N	Mean	Std. Deviation	Std. Error Mean			
IEARNING OUTCOME	12	78.567	3.3679	.9722			
SCORE							

One-sample rest								
		Test Value = 80						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Diffe	e Interval of the rence		
					Lower	Upper		
IEARNING OUTCOME SCORE	-1.474	11	.168	-1.4333	-3.573	.706		

**One-Sample Test** 

### 9. Paired Sample t Test analyzed with SPSS 21

#### BASIC CONCEPTS OF PAIRED SAMPLE T-TEST

 $\checkmark$  Paired sample t test is used to determine whether there are the difference in the mean of the two paired samples.

 $\checkmark$  The two paired samples in paired sample t test are the same sample but has two data.

✓ The test conducted in paired sample t test is part of parametric statistics, therefore, as the rules in parametric statistics, research data must distribute normally (Everitt & Skrondal, 2006; Garth, 2008; Kim et al., 2018; Orwa et al., 2014; Wagner, 2015).

#### PAIRED SAMPLE t TEST EXAMPLE

A researcher would like to undergo a research in which the aim of a research is to determine the effect of cooperative learning model of Teams Games Tournament (TGT) type on students' English learning outcome.

To prove this, the researcher chose an English class that consists of 22 students.

The research method is quantitative with One Group Pretest-Posttest Design. Data collection techniques use experiments and direct observation, while one of the instruments is an English speaking test. Data analysis is t-test from pretest and posttest data.

The average result of the learning outcomes of the 22 students is as follows. (go to excel data)

#### **RESEARCH DATA ANALYSIS WITH SPSS**

1. Conduct a normality test to find out whether the average result of student English learning outcomes is normally distributed or not as a requirement for paired sample t test in Parametric Statistics.

2. Perform a paired sample t test.

3. ANALYSIS STAGE

INPUT -->ANALYSIS -->OUTPUT

(open SPSS 21 for inputting data from excel, do normality test)

#### **DECISION BASED ON NORMALITY TEST**

If the sig. value > 0.05, the data distribute normally.

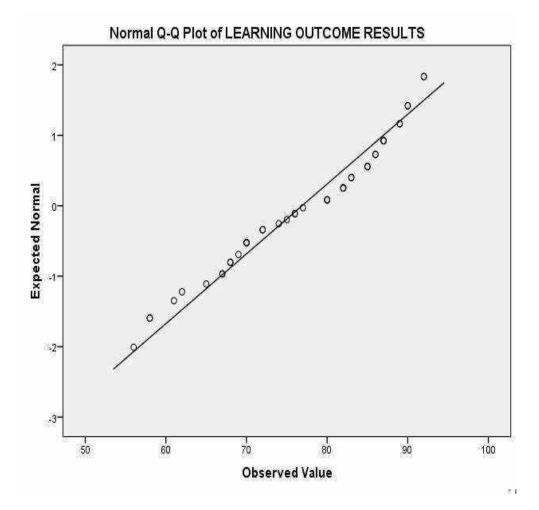
If the value of sig. < 0.05, then the data do not distribute normally.

If the data distribute normally, go to Paired sample t test.

	Kolmo	gorov-Sm	irnov <sup>a</sup>	Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LEARNING	.126	44	.079	.950	44	.055
OUTCOME						
RESULTS						

**Tests of Normality** 

a. Lilliefors Significance Correction



#### SPSS OUTPUT INTERPRETATION

#### FIRST OUTPUT

_		Paired Sa	amples St	atistics	
		Mean	Ν	Std.	Std. Error
				Deviation	Mean
	PRE	69.2273	22	6.10177	1.30090
D · 1	TEST				
Pair 1	POST	86.5455	22	3.76358	.80240
	TEST				

This output shows

the

summary results of descriptive statistics from both samples or pretest and posttest data. (Mean, N, Std. Deviation, Std. Error Mean that explain statistics descriptive)

#### **SECOND OUTPUT**

Paired S	Samples	Correlations
----------	---------	--------------

		Ν	Correlation	Sig.
Dein 1	PRE TEST & POST	22	234	.295
Pair 1	TEST			

The second part of the output is the result of the correlation or relationship between the two data or variables, namely Pretest and Posttest.

The second output explains whether there is relations between pre test and posttest. It is found that the significance is 0.295 > 0.05 it means there is no relation between pre test and post test.

#### **THIRD OUTPUT**

**Paired Samples Test** 

	Paired Differences	t	df	Sig. (2-
--	--------------------	---	----	----------

	Mean	Std. Deviati on	Std. Error Mean	95% Cor Interval Differ	l of the			tailed)
				Lower	Upper			
	-	7.8823	1.68053	-	-	-	21	.000
Pai PRE TEST -	17.31	9		20.8130	13.8233	10.3		
r 1 POST TEST	818			4	3	05		

#### BASIC DECISION MAKING FOR PAIRED SAMPLE T TEST

1. If the value of Sig. (2-tailed) < 0.05, then there is a significant difference between learning outcomes in pretest and posttest data.

2. If the value of Sig. (2-tailed) > 0.05, then there is no significant difference between learning outcomes in pretest and posttest data.

#### DECISION-MAKING

It is known that the value of Sig. (2-tailed) is 0.000 < 0.05, so we can conclude that there is a significant difference between the results of learning English in the Pretest and Posttest data.

Through the cooperative learning method with TGT type, it can improve the English learning outcome. Thus, the result of paired sample t tests shows there is a significance difference between the results of learning English in the Pre test and post test scores.

The other ways can be done to detect the significance difference through the comparison of tcount and ttable. But significance 2 tailed is effective and accurate enough to find whether there is significance difference or not.

### PAIRED SAMPLE T TEST SPSS TUTORIAL & PRACTICE

# PAIRED SAMPLE T TEST:Sig.Value 0,05.Normality Test :Parametric Statistics.

FIRST step install SPSS in Your PC

Basic Concepts of Paired Sample T-Test

- a. Paired sample t test is used to determine whether there are the difference in the mean of two paired samples.
- b. The two paired samples in paired sample t test are same sample but has two data.
- c. The test conducted in paired sample t test is part of parametric statistics, therefore, as the rules in parametric statistics, research data must distribute normally.

	5 T 4 3	and the second second	10 H +++		222		- A.			1.14	100		1.000	-		
2.1	S. cont	11111	10.0			12.00	11025	- 114	200	- 10	- 31		34	1.00		
Q	1.1.1	Harrison Ber	1 - C - C		1.19	10-16-1	THE R	the state of the s	ALC: NOT THE OWNER	10	Thegod P.	100 C 100	of these ?		inter i	
	1 A.															
100																
A		-						1.1			10					
- 1	- Secondary	CONTRACTOR -														
-		A REPORT OF														
	** **	-														
	100	100														
100	44	100														
872	10															
	84	100														
	78	1944														
1	12120	194														
	- CA -	100														
W	- 2															
10.5																
11	78				-	-										
H	1.1.1.1.1.1.1.1				1	_										
14. I.	- 5															
1	10															
					-											
10		10														
1																
	11															
5	44	100														
	4	- 10														
	Colorest Ar															
										142-1	The second state	100		-	-	
			and the second se	-	Concession of the	A DESCRIPTION OF TAXABLE PARTY.	and the second second		-	10	And the owner of the owner owner	1000	-	and the second second	-	-

#### 1. Go to excel word, and enter the data for accuracy data.

#### Paired sample t test EXAMPLE :

A researcher would like to undergo a research in which the aim of a research is to determine the effect of cooperative learning model of Terms Games Tournament (TGT )type on students' English Learning outcome.

To provide this, the researcher chose an English class that consist of 22 students. The research method is quantitative with One group pre test -post test design data collection technique use experiments and direct observation ,while one of the instruments is an English speaking test.Data analysis is t test from pre test and post test.

The average result of the learning outcomes of the 22 students is

as follows . RESEARCH DATA ANAYSIS WITH SPSS

1. Conduct a normality test to find out whether the average result of student english learning outcomes is normality distributed or not as a requirement for paired sample t test in Parametric statistics.

- 2. Perform a paired sample t test
- 3. ANAYSIS STAGE

INPUT -ANALYSIS -OUTPUT

Tent State Tent	Egen Frankrit Frankrit Frankrit		LAND CONTRACTOR OF THE SECOND	Veren See	N N N N	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	111	
				11				

2. OPEN SPSS 21 For inputing data from excel do normality test.

THEN, go to values, click and type values:1, and label : pre test and then click ADD

Law and California Mathematical Anna Anna		
Statut		
and the second s	(inst)	
herd out man		
1		
Canal Marcel Land		

### Click ok

15-min the second secon	Value Mar Note Dece Note Dece Note Dece	1 1111 14	ILI	
S min the				
	Conclusion	6861		

The Page of a 7	AND AN	1122 1222 12222	annia 12 mile 12 mile 14 mile	Hir	
	Structure were an were an Market Service Market	-			
	CHOINE				

### 3,Click Data view

11.365		The second second	-	-	 	-		-			 	-	Sales ( a	
			-	1.46.1		-		-		1.14	 		-	
		_										_		
100														
200														
£														
5														
100	_				 -	_	_	_	_	_	_			_

3. Copy and paste the data PRE TEST TO data view in RESULT

M.,	1.5	8 B.											
1	-	11	8.8		1.00		100			10.			8
	100 10 10 10 10 10 10 10 10 10 10 10 10	0.1.1	10-16-1	and the	100								
	- Alter	the second se	11111										
1	14 12 ton		1.44										
	3. Sec.			14 C - 1									
	- A tore	a Sector											
	11			1									
				*									
11	10 A 10												
1	- 1 H H	10.1											
	1.4			1									
-													
	AND DO NOT		1000										
		a han	1.1										
4 1 7 70 8 10	a and	a bai. Sector and a sector a	Transa Drobanto	0						Concession of the local division of the loca	24	<b>K</b> •14	
4 1 7 70 8 10	2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	a bai. Sector and a sector a	Transa Drobanto	0					and the second se	Concession of the local division of the loca			-
A Participant		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			
A Participant		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
A Participant		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-
		atal Nilitatan Yangaran Yangaran	Transa Drobanto	0		Maria I.				Concession of the local division of the loca			-

4. Go back to excel copy and paste the post test result

0	1.64	Partnerson 1		NUR -	iging ( Cons			A	ille.
1	-	Partnerson 1		0.000	11116	- Indiana			
11		Performance in the second s							- A. A.
10		The second s				the state of the s	R R.	and the second second	
12			SE 11 1						
1.1		SE 304-21	SA E A						
	10		a the second second						
	- M.	- LAN	1000						
	- 25								
1		- Mail Pre-	34 ( L						
		Bren Bren	THE PARTY OF THE P						
1	12	Martin Barrison							
12	10	-							
17. 11.	14	A THURSDAY	2						
		2 0							
10	16	and the same							
15	- 40-	** d							
P	1	S Alertan							
5	- 22 - 1	Martin St. Surfraget							
I S S S T R R.	517212303								
100	a l	WANTER T							
1.	- 10 - E	an 11 A 14							
8		and the second second							
100	11	- Canadiana	A.4411						
		Spinster.	and the second sec						
	Shade &				1 A 4 A 4				
barry to be		designed by a				24- B	B # C +	C. States and the	-

		-	COLUMN TWO IS NOT			_	_	_	_		-	_	 	_	forger (1	1.1
-	-	-		- 10			1.00	-				1.00			100	
	NAL T	-														
-																
-	141. 121.	_				_										
		_				_										
						-										
	100	- 1														
	10	_														
	20.	-														
	-	_														
-																
						-										
	100													-		
	191															
	and the	-														
		_				-								_		
	121124						-									
	10															
	18.	-														
1	-		_	_	_	_	_	_	_	_		_	 _			

Check the normality test

5. Go to the spss -anaylize -descriptive statistic - explore

and a second	product an	The other later.	the second secon	Inches Inches	and share the second second	and the second se	And in case of the						
10.00			Bart Harmonia 2						-				_
1		100	I I Sport at the Address of Taxat	distant.	and the second		1.00	0.0					
			-		and game							Transform.	10.14
	- Martin	1000	There was stated			and the second second		-				-	
	100		monthing to be	Contraction of the local sectors of the local secto	See.								
	142.1		Personal production and the	1.4	Law and								
			Martines.	14	Presenter and a second								
	14.				Street.								
	12		Barrows	1. 10	and the second second								
	1977				12.000								
11				1.1									
	10		Contraction of the second										
t	100												
	200		No.										
	100		distance in the										
-	-		T Manual N										
	1		Same -										
-		_								_			
÷	100			100	_								
	101		Contractor on the state of the										
	10		Buildin and Barlin	12									
	100		the second s										
	- 11		The second	1.1		_						_	
	10		A CONTRACTOR OF	1.2									
	10.		Contraction and										
etta:	No bear		(196) ;			V 📥 I					1-1 - A		
10		proving.	Billion Decimination		Contract Contract of Contract				Ma.			_	*
11	14 AN	Branker Brank	E And	1				-	**			-	1 (20)
	the line	proving.	Billion Decimination		Contract Contract of Contract			00	96 1040 104	-	1	-	
H I	1944 - 2044 575 - 2044 2044 - 2044	Branker Brank	E And		Contract Contract of Contract			-	<b>%</b>	-		-	
	A DE LEV L	Branker Brank	E And		Contract Contract of Contract			00	-			- 19	
	A DE LEV L	Branker Brank	E And					00					
		Branker Brank	E And	-									
	A B ANARY	Branker Brank	E And	-					-			-	
	A B AVAULT	Branker Brank	E And										
	A CALENCE	Branker Brank	E And									-	
	A STATISTY	Branker Brank	E And									-	
	A CALIFORNIA CONTRACTOR	Branker Brank	E And									-	
	A STATESTA	Branker Brank	E And									Tagle	
	A B STATESTANT	Branker Brank	E And				الي ا 					-	
	A B STATISTICS	Branker Brank	E And									-	
	A B STATESTANTES	Branker Brank	E And				الي ا 					Sec.	
	A B STATESTATES	Branker Brank	E And				الي ا 					-	
	A B STATESTATES	Branker Brank	E And					NGC N				-	
	A B STATESTANTING	Branker Brank	E And					NGC N				-	
	A PARTICIPATION PARTICIPATION	Branker Brank	E And					NGC N				-	
	A B AVAILABLANDERSEN	Branker Brank	E And					NGC N				-	
	A B STATESTANTESTATESTA	Branker Brank	E And					NGC N				*	
	A Revenue of the second	Branker Brank	E And					NGC N				-	
	A B STATESTANTESTATESTA	Branker Brank	E And					NGC N				-	
	A B AVAILABLE AV	Branker Brank	E And					NGC N				*	
	A B AVAILABLE AV	Branker Brank	E And					NGC N				-	
	A STATISTICS AND	Branker Brank	E And					NGC N				-	
	A B STATESTANTESTANTESTANTES	Branker Brank	E And					NGC N					

Click dependent list box.

Click plots , click normality test -continue -OK

Barrow     Barrow       Control     Barrow       Control     Barrow       Control     Control       Control     Control </th <th></th>	

- There are 3 OUTPUTS 1. case processing summary
- 2. Descriptive
- 3. Test of Normality

· Experie	<b>派派集</b> 目	1-21	0 14	10 B		7. 7	
territy:	-						
- C		1.000	A	_			
	S ( News	1.00	Permit	1.00	-		
CONTRACTOR	an Anna	1	416		10.		
Millines.	Ann The Carlos of the Carlos of the Carlos			44 1140 00	10.0		
	Party and the second	. Addition of					
	- Hereitan - Hereitan		3	8			
	P145 Second St Haran Statistics Televisi						
	Tent alle	1.11					

Sig.	Taxa a factor of the second seco
Sand Street	Langette baland to the second test of test
Barrister and	A JOY & BOMBER STORE
- Contract Contract	Theorem . Note: Last
	Turns         No         Nom           4.1 mm         6.1         10
	Late a control for the second

The significance of the data use Shapiro wilk

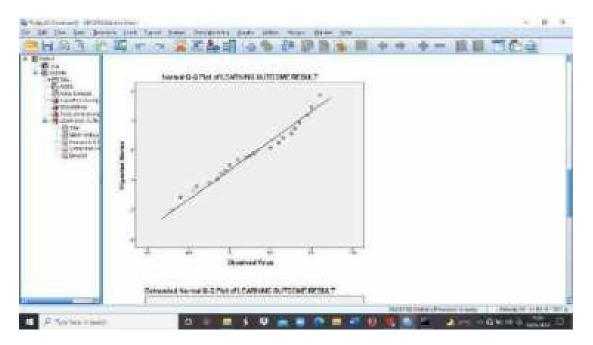
**Decision based on normality test** 

If the sig. Value >0,05, the data distribute normally.

If the value of sig <0,05 ,then the data do not distribute normally

If the data distribute normally ,go to paired sample test

The data is normal



After the result data is normally ,so go to Paired sample t test

Go to excel copy paste the data PRE TEST TO SPSS In column Pre Test

				105	1.04 B	- 10		ant.		5	1.10	1	e	11	10		
1		A 4								1.0000					-		
100	-	- 10 H	10.00	14	10.1	1.4.5	100		1101	1.	100	10	1.00		1.0	1.1	14.2
100	Design for	House Hild The	100														
	A DECEMBER OF	And the second second															
	**																
11	-2																
12.4																	
1.0		200 200 200															
2.1	Å.	100															
1.0	11																
	- 27	100															
		100															
10	-22																
10.0	44																
12	- 0	10															
11																	
- 14	10																
	1000																
	- N																
M. C.	1	21 10															
1																	
21																	
5	- W.																
21		-															
	Summer Street, or other																
	Contraction of the local division of the loc	-+++141										100					

					_		_	_							_	See 20	
	and the second second		-	-		-		-		-	-	1.00	1.00		-	-	
	10.0 1 2 2 2	2.8.2.2.2.2.8			_												
	10	- 48															
		- 61			_												
	100				-												
	24	- 10															
	-	-11	_	-		-						_					-
		10															
	14 	100															
		1			_												
			_			_		_	_		_	_		_			-
	10.2.4	12.2.3															
	10	14															
	100	10															
	10.1																
10-set	1	- 77			_												
	-	- m-			-												
		1			_												
			_		-				_								

### Back to excel Copy and paste Post test data to spss in column post test

A A T	100	20100			Eres al	12.0		a seasons Ta ata
- 6 (1) - 1 - 1				an one	To A second and the			ale mene
Sec.	Park P	ALC - 94	114111	and the second	1.1421.041	100 10		
States States		Car III - D	11000		and a second	0.1		T
COLUMN STATE	A REAL PROPERTY AND A REAL	CONTRACTOR OF A						
11 1 0 1	Real Property lies	long.c						
11 M	Sime	1001						
1 4	12.64	19-17						
4 11	C second							
	A more							
1 A.	and the second se							
1 4	1 th	+						
	12							
And a	American							
10 St.								
	1-44Ph							
M2 36	1.00							
10 10 10 10	22 reasonair	1 march 1						
a 9	No marca							
	+100 minutes							
	1990							
have a second second second	Contraction of the local division of the loc	and the second s			2.4-	10.000 00.000	distant in the second second	( i

						-		14							page 3	e,
And the second second	199.			- U.S	-		-	11.64		11.000	11.46	-	1.100	1.0	-	
8	-	4														
<b>H</b>	15	н.														
0	10	18														
	. 17															
8	18			_												
34		- *														
	11		_		_	_			_		_		_			_
	10			_												
	1															
18-1	- M.	- 44		_												
7		11	_				_		-	_	_			_		_
- P.	×.			_												
17.	10	<i></i>		_												
1.1.1.1	- 14															
	- <u>1</u>			_	_		_		_		_		_	_		
2	18	.0		_	_				_	_			_			
101		10		_												
6	4	- W.														
A.,				_	_		_	_				_	_			-
1		- M.	_	- 10	_	_	_	_			_		_			_
11	10			_												
	-	_	_			_		-		_	_		-		_	_
-			_	_	-	_	_	_					_	_		

Paired sample t test in SPSS Go to analyze -click- COMPARE means -Paired sample t test

No.         No. <th> 9 G</th> <th>The second</th> <th>Operation in make</th> <th></th> <th></th> <th></th> <th></th> <th>Sector 1 and the</th>	 9 G	The second	Operation in make					Sector 1 and the
A A A A A A A A A A A A A A A A A A A	NUMBER OF BRIDE	1016 10	Barrelov bill Westpiller Bill Barrel Server Server Lafer Anton Barrel Server	Hit is an intervention in an and intervention in a second intervention in a second intervention in a second intervention in a second intervention	-	*.1. *)	-	
	4.611.14	10.00	Annora Internet Salations Salations Salations Salations					

Send the box pre test to variable 1 click the box

( Line and the line is	100	19-4-10 10-401 10-	100	and the second			-	100	_	-		_	-	-
A PAR PAR	1 100			and a constant	10000	and the second second							Sec. 1	211.2
A Port Port		P cores	1 1 1		÷					-		-		
-	- 12													
		144	-				-		-	-				
	E I N	1												

Send the box Post test to variable 2 click the box -click option make sure the percentage is 95 % and then click continue.

Contraction and	Brief ingen 2 billion		Acres 1	E-C.E	209	1.00		
A POST OFFICE	and the local data and	and the second second	and the second	Name of Column 2 and a state				100 (m) (m) (m)
		-						
81 - 25 81 - 80		_					_	
				-		-		

The result of paired sample t test 3 OUTPUTS :

- 1. Paired sample statistics
- 2. Paired sample correlations
- 3. Paired samples test

	Mar III Charles and a	CALE LOS			(e. 16)	1. 10. 100	10.10	TCa:	
I the second sec	1.187	Contraction of the local data							
	Tope and the second								
	Lobis settinging 1 15								
			a frequencial						
		1147.0	Contract of the Contract of th	_					
		making and	- Thomas		10	in traine			
	Louis and Star College	1.84 1.4		1102 1100	100				
				II - Constant all Cons	-				

# SPSS Output interpretation First output

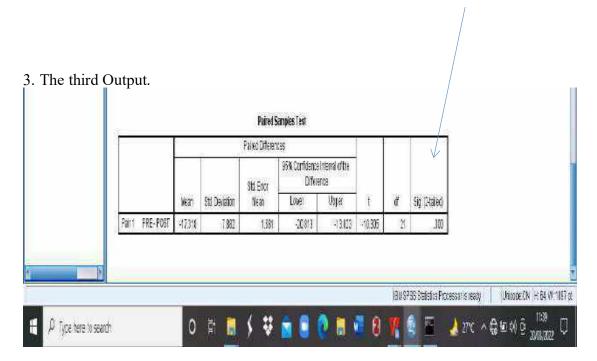
-Bite -Bernetu -Disease -Disease	• T-Test	Para	(Sayke)	ininini i	
-Qaod -Qaod		w	1	3.1-min	Bi Sm Nat
- Don - Don	241 FE FB	10 61	1	872 274	in T

The output shows the summary result from descriptive statistic from both samples or pre test and post test data.

# 2. The second summary result is paired correlation



the second output explain whether there in correlation between pre test and post test. There is significance 0,295 > 0,05.it means that there is no relation between pre test and post test.



Decision making paired sample t test

1. If the value of sig.(2-ttailed) < 0.05, then there is a significant difference between learning outcomes in pre test and post test data.

2. If the value of sig (2-tailed )>0,05, then there is no significant difference between learning outcomes in pre test and post test

Conclusion

It is known that the value of sig (2-tailed ) is 0,000 < 0,05 so we can conclude that there is significant difference between pre test and post test Through the cooperative learning method with TGT Type .It can Improve the learning english outcome.

The result of paired sample t test shows there is significance between the results of learning english in pre test and post test.

### **10. INDEPENDENT SAMPLE T-TEST WITH SPSS**

#### **BASIC CONCEPTS OF INDEPENDENT SAMPLE T-TEST**

- The test in Independent sample t test is used to determine whether there is a difference in the mean of two unpaired samples.
- Terms of parametric statistical test: Normal and Homogeneous (Allen, 2017; Everitt & Skrondal, 2006; Field, 2005; Garth, 2008; Gerald, 2018; Jackson, 2009; Wagner, 2015).

#### **INDEPENDEPENT SAMPLE t TEST EXAMPLE**

- A researcher made a conjecture stating that "there is significant difference between the result of student English learning outcomes in Class A and Class B".
- To prove this, the researcher chose randomly 22 students in Class B and 22 students in Class B.
- The result of the learning outcomes of the 22 students in Class A and 22 students in Class B is as follows. (go to excel data)

#### **RESEARCH DATA ANALYSIS WITH SPSS**

- Conduct a normality test to find out whether the average result of student English learning outcomes is normally distributed or not as a requirement for Independent sample t test in Parametric Statistics.
- Conduct homogeneity test. If the data is homogeneous, the Independent sample t test can be conducted.
- > Perform Independent sample t test.
- ANALYSIS STAGE INPUT -->ANALYSIS -->OUTPUT (open SPSS 21 for inputting data from excel, do normality test)

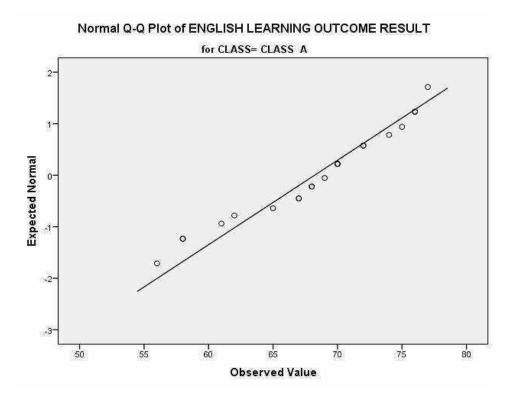
#### DECISION BASED ON NORMALITY TEST

If the sig. value > 0.05, the data distribute normally. If the value of sig. < 0.05, then the data do not distribute normally. If the data distribute normally, go to Independent sample t test.

Tests of Normality									
	CLASS	Kol	mogorov-	Smirnov <sup>a</sup>	Shapiro-Wilk				
		Statis	df	Sig.	Statist	df	Sig.		
ENGLISH LEARNINC	CLASS A								
OUTCOME RESULT	CLASS B								

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction



#### HOMOGENITY TEST WITH SPSS

#### **BASIC CONCEPTS**

Homogeneity test is a test of whether or not the variance of two or more distributions is equal. Homogeneity test is usually used as a requirement in the analysis of the Independent t test and ANOVA.

#### **Decision-Making Basis**

- > If the significant value is > 0.05 then the data distribution is homogeneous.
- > If the significant value is < 0.05 then the data distribution is not homogeneous.

Levene Statisdf1df2Sig.Based on MeanBased on MedianImage: State of the state of th	<u> </u>	nency of variance			
ENGLISH LEARNING OUTCOME RESULT adjusted df		Levene Statis	df1	df2	Sig.
Based on trimmed mean	Based on Median Based on Median and with			3	

#### Test of Homogeneity of Variance

#### **BASIC DECISION MAKING OF INDEPENDENT T TEST**

1. If the value of Sig. (2-tailed) < 0.05, then there is a significant difference between learning outcomes in CLASS A and CLASS B.

2. If the value of Sig. (2-tailed) > 0.05, then there is no significant difference between learning outcomes in CLASS A and CLASS B.

#### SPSS OUTPUT INTERPRETATION FIRST OUTPUT

**Group Statistics** 

		<b>A</b>			
	CLASS	Ν	Mean	Std. Deviatior	Std. Error Mea
ENGLISH LEARNING O	UTCOCLASS A		68	6.	1.:
RESULT	CLASS B		85	3.	

This output shows the summary results of descriptive statistics from both samples or class A and class B data. (Mean, N, Std. Deviation, Std. Error Mean that explain statistics descriptive)

#### **SECOND OUTPUT**

#### BASIC DECISION MAKING FOR INDEPENDENT SAMPLE T TEST

1. If the value of Sig. (2-tailed) < 0.05, then there is a significant difference between

			ne's Test v of Vari			t-te	st for Eq	uality of	Means	
		F	Sig	1	Ċ	Sig. taile	Mea Differe		Inte	Confider rval of th ifference
									Low	Upp
ENGLISH LEARNING	Equal variance assumed			-1			-17.:	1.:	-20.4	-14.1
OUTCOME RESULT	Equal variance assumed			-1	3		-17.3	1.:	-20.4	-14.1

#### **Independent Samples Test**

English learning outcomes in Class A and Class B.

2. If the value of Sig. (2-tailed) > 0.05, then there is no significant difference between English learning outcomes in Class A and Class B data. DECISION-MAKING

It is known that the value of Sig. (2-tailed) is 0.000 < 0.05, so we can conclude that there is a significant difference between the results of learning English in the Class A and Class B data.

Thus, the result of Independent sample t tests shows there is a significance difference between the results of learning English in the Class A and Class B scores.

The other ways can be done to detect the significance difference through the comparison of tcount and ttable. But significance 2 tailed is effective and accurate enough to find whether there is significance difference or not.

# 10. INDEPENDENT SAMPLET TEST SPSS TUTORIAL & PRACTICE

# INDEPENDENT SAMPLE T TEST - NORMALITY TEST & HOMOGENITY TEST.SIGNIFICANCE 0,05.

				1.6	1000	1.0	1.1	1.1	1.	161	1.54	1101	18	
100	100	Case of Case o									-			
			88											
1.1	10.		44											
			44											
			48											
100	10.1		10											
10	10		47											
			11											
			11								_			
	18		11								_			
100			la la								-			
11											_			
- 81			11					-	-	· · · · · · · ·	-	_		
	19 A		Ħ								-			
100			11. 1								-			
1.2	100													
- 51	den al Carlo		87								-			
1.5	1000		22											
10	1000										-			
-		-	1					_	-		-			-
- 14	100		10											
120			A											
								1.1						

4. Basic concept of Independent sample t test

-The test in independent sample t test is used to determine whether there is a difference in the mean of two unpaired samples.

-Terms of parametric statistical test :Normal and Homogeneous.

**STEPS** 

1. Conduct a normality test to find out whether the average result of student English learning outcomes is normally distributed or not as a requirements for independent samplet test in Parametric Statistics.

2. Conduct homogeneity test, if the data homogeneous, the independent sample t test can be conducted.

3. Perform independent sample t test.

4. ANALYSIS STAGE

INPUT- ANALYSIS -OUTPUT.

Constructing California (1) and the second california (1) and the	0
Field Said, You 3 Billion Sold	
	NAME AND A DESCRIPTION OF A DESCRIPTION
	An of the second

COPY THE data excel Class A to SPSS

	1121	199.00		•		den .	ferie 		fore .	140.1	-	-	i an in			÷		
7.00 600	and the second second	14) 11月1日			7.2-5 6-1-1				ante La nombre	N. 16.	(書)		a and	1.2	A		104	1
Sec. 1	in Anna - B	R. 6. 000, 000	19-10-4	(MC - 8-)	10. IN . IN	0	10.000 F	11 0	1.19	00,910.	Section 1	1000	ue-	- Autoria	cado	c ar.	110.00	
11		8,4 17																
1		121	1.62	2909	140	40	121		11011	16	42	16	1212	54	i.	142	121	
	-	TO THE R		1.4				1	1		-	198	2.8					
1993	-DRUA	CAL		4.1														
	W.			14	E.													
1	1	#		1	1													
1		10		1	4													
4	1			1.1														
1	- <b>R</b> -	.10		1.1	1													
1	100	1		1.1	4													
£	11	1		- 4														
1.	- 11 -			1.1	1													
1.	1			1	1													
10		-15		1														
н.	. 17																	
11	п	36		1.1														
11	1 2 8 2	11		1.18														
н.	- 10	- 78		1.1	E .													
<b>P</b>		- 11		- 7	- 5													
H I	1	1			1													
n B	1	8		100	1													
10		2																
2	-	- 29		1	1													
2	47	1		- 1	- 2													
21	-	1.2		- 12	1													
1.00	Contraction of	1. 22																
		24									-		in in					1
distriction (	4 14 4 3										244	1.16.2	日本	107. 10	a se el la			

Consequence de Principalitation de la consecuencia de la conse el consecuencia de la cons	i men an bein bei Dierreisenen	10 A colore
●本公司 ティガト語書 本田田 福介	11 Anthe Anth Anthe Anthe .	
I I I I I I I I I I I I I I I I I I I	ALL 10	
		Anima Sector
		Emolities and a second
		Heating 3 P
		Nedaga
	- T	
		Anglet State
A Property in the second secon	THE R. P. LEWIS CO., LANSING MICH.	Contra de la contr

# COPY THE DATA of class to SPSS

Sin -	BBB	6850. 6850	-	-	et facad	Inte	Do los	e Neit	2 1	(daish)	limit		0 0	80		
		₩07 B / ⊻·B			1.00 1328 y		5 mm 7 8-5	199	-Finite Institution	₿rim ⊋ca	entide-		- ieit	Å.		
4	- 4	261														
4	1	1	183	1 hours	. C. W.	14	1 1	Ð	1	я.			110	4	1	
1	5	1			1				1		-	_	_	11072	_	
1	10	1	_	- 1	1	_	_	_		_			_	_	_	Ŀ
1		8		- 01	I.											1
4	2			1	4											
A.,	11	3			1						-					
6	- 97	1			. 3						-					
	Π.	1.1		- 13							-					
1	1			- 18												
4	1	-		- 1	4			-	-	-		-			-	÷
11	-			4	1			-				-	-			÷
0	1	1			1			-	-			-	-			f
1	1	1		1000	-											
14	-			14	1											
5	2			-1	1											
1	2	1		1	1											
ų.	11			11	I					-						
	6				1											
1	0	10		1	1											Ľ
Ε.	1			1	1											1
1	11			11	-1											1
	. 11			- 14												
				- 1.1												
	1.040	+						1.60								
	n contra	teril.							日本	- 61	0.0	1 T	No.		-	1
-		8867			1 6	1	-	And in case of the local division of the loc	and in case of the	100		100		<b>1</b> 987		Ī

Q*met/web. Hittheetlatte								a n	Jinte	-	
		n Tarini Island March M	(144) (14	日	6		12	7	金田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田		
PERIF BARA				lindigen Institute			_				64
A REAL	- 1	4	E			1		100	4		16
1 2 3											
1 1 3 3											
H M H											
E E H E E H											
								_			
MUTTO Desta Anna Anna A			1.0	20.00-		20					112
E J Internet 0 2 B	s U 🔳 I	0	1	0.1	Ŵ		•		e) 10 0	-	100

And then go to data excel score class  $\boldsymbol{b}$  copy and paste to SPSS

and Dia	1. 10 1	10.5	1. K.			11 10 2 10	Line and the	X. 1	and (a)		-	See		X.	.A	14		
	10.00	10.041.04					-	Turn			19115							
. H			1.00	1.0	1.5	1.8	- 98		10	0.0			19	1.0		36	9	
	-	(and the second		1.	ē.,	1												
100	1	100			1	1												
1.1		1			2	1												
2.1	1.1				2	<u></u>												
1.0	-	**			2	1												
12.11	- 12	186				10												
	- 10					11. C												
1					-	-												
1	1.2	10			2	1												
100	- 80				2	2												
10	21 21 21				1	÷												
10					1	1												
-		-	-			B												
21	- N N 10	12			1													
10	1000				2	-												
÷.					2	2												
	88	*			8	1												
4	4	-			4	£												
	100				4	1												
	1.00	1								Co. La								
										10.00	2.6-							

HART			a de se de se	
and a state of the		Well-Maily		The state of the second
AND A WART OF		-		
14				
End Minister				
B BC				
F 16				
F 10				
8 N.				
6 BL -				
the second s				
and Completene	Charles Provide Lines			

- Barrier	100	8.3.14/89	\$1.6-1	n48e-3	1.2.23			10 B	nadi De 182 det	war-	and the	Stee	1997	-manine	1.410	- lie	61.10	ali de
		10.46																
2	ALCONO.	ALC: NO.		12	-		24	12	1.1	1.2						10		
10.1		N. S.		1.1	1													
1.1	1				Particular I	E												
1.1					3 1													
20	1000				1													
	- 10				-													
3.1	10.	18																
1																		
-																		
11																		
10	1.82				-													
E		- 2-			3-10-1	-							-					
	14				1										_			
*	1.00																	
1					1													
21	1000	100			1													
8	19.																	
	2 - 1 - 2 - 4 -																	
10	100																	

2日日間でつどを引きれます。	 	Dia ata Dia ata Dia ata Dia ata	ener T	in in all a c V A c salar in	
		6 UK	100		• :: • ::

Decision based on normality test

If the sig. Value > 0.05, the data distribute normally If the value of sig < 0.05, then the data do not distribute If the data distribute normally, go to independent statistic.

	= Ohda'	A
Barrier Brannetter Partie Pa		
	JONGOULTVIDELISM	Car States share a set -

.Go to Analyze --descriptive statistic-explore

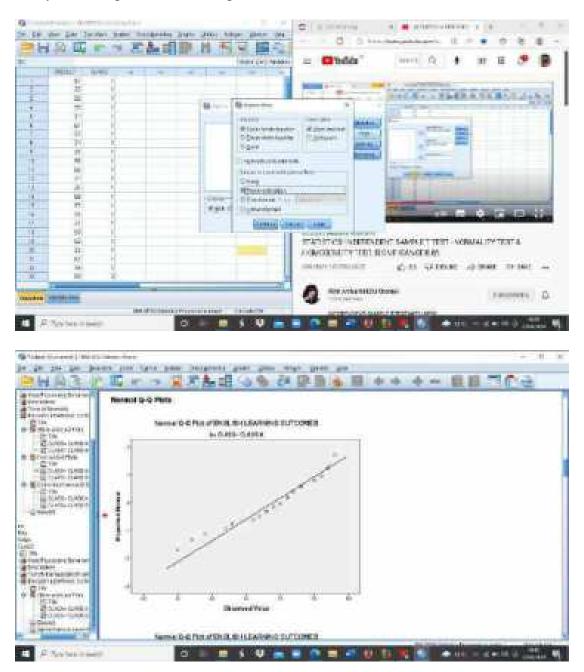
There are 3 outcomes.

	100				
THE REAL PROPERTY AND A	4 Autor 1 Date		1.000		
	( <u>) () () () () () ()</u>	6 6	100		
None-	Invideo				
And Inc. of Contract States	1.04	10010	100		
(Barrens)	Philippine and the first	1000			
300	19 Sectores	11			
(#1/1a-	Contract of the second se	11200	-		
10000000000000000000000000000000000000	An Inclusion		_		
100 Mar.	rings ritesection				
all faith and a second	Marries .		10		
1000	And Contemporters conclust	310	10		
	Manager and Manager	- 1111	_		
	dontes Volumes	104			
	10.141000	1000			
	Colors and Colors and Colors		Contract over the	-	and the state of the second
0).				<b>4</b> 🛃 🔶	in martilla,
To reality out					
e herite piet (jeut paus le	utions Base Dim sola	1204013	10		
1 SEcold	「「日日の日」	N IN C	1 4 1	h de mail	
CO MARCH MA	Ref A A A A			an a	
13,401		<b>H</b> Ĥ	87		
	Western and the	10			
	Abirtober	14.00	-		
iai i	Veda:	100	_		
	THUS	1659			
Chain	80.04484	395			
intern	Martin	1.00	_		
C Bellin	faige	- 10 - 10	-		
12	MUTCH	1			
2010年 出704	birm	10			
234	FORMS.	1114	箱		
304					
Barter I.	YO CHING				
L2 Clas	hitsolaid	PERMIT			
(1.42) (1.42)	316 7 5 316	C d	30		
State Contraction States			12		
994	فتصحب والانتصاف المتكار ومعطوفة فسيبابه	1 2	.12		
And a second	nine .				
Allowedgesertame					
and and the second second					
ENGLISH LEARNING OU	TCOMES				
ZB252555744801					
Sam-and-Last Picts					
METHERING ORDER					

Class A and Class B can distribute normally.

Homogenity test

Analyze- descriptive statistic- Explore



Homogenity Test Decision -Making Basic

-If the significant value is > 0,05 then, the data distribution is homogeneous. If the significant value is < 0,05 then the data distribution is not homogeneous.

CONTRACTOR OF THE STATE	and Printers				Contraction of the local distribution of the	*		101
	1.3049	1		-				
A 117 VIII. IN JANUAR 20024-104 UTURI DESCRIPTION DESCR	6044 1177 0.07 1.010		4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	H H H				
Anter and and finds	et This To							
Frequency Harry Loc 1.11 Second Solid 1.12 Second						1	tools new: atom	
Anna Startato Al Antalia Interio								

Next step Go to Independent t test

Basic decision making of independent t test

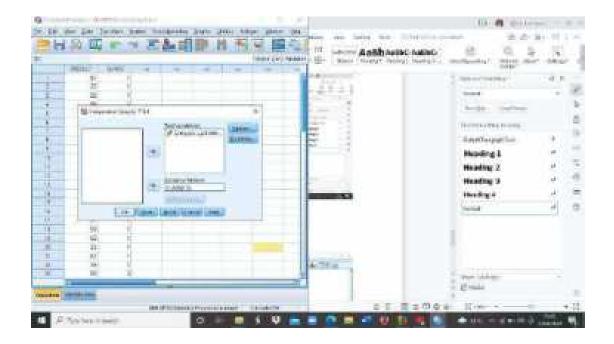
1. If the value of sig. (2 tailed )< 0,05, then there is a significant difference between learning outcomes in CLASS A and CLASS B.

2. If the value of sig. (2 tailed )> 0,05, them there is no significant difference between learning outcomes in CLASS A and CLASS B.

## Go to SPSS TO

#### ANALYZE - COMPARE MEAN - INDEPENDENT SAMPLE T TEST

Received and the second second				(D) 🖷 (D) - Series	
	Terrer Terreren Sperio Caracteria Terrer Terrer Sperio Caracteria Sperio Caracteria	Allen Major plane (Ma All Fill W (Ma) Marcold Art File All Marcold Art File All Marc	Tate	8.0.2	and the second second
	A COLORED		51 200	COLUMN TWO IS NOT THE OWNER.	- 22



	G ra		41	99	目目	2 3		44	+ -		364	
Constant Con	t dit oomoac Santo-maan Amaar-tatta famato-tatta	171 2119 212 D 2 2	extendes	Level contra Diviliari chariteria co-	170							
	T-Test											
Ú		98	Creat Name									
lik Sekfelander, Sek	-		N.	20	ater Met							
Decembra Tariati ang national a	ELECTRONIC OF CONTRACTOR	1138 1139	-		and the second second	138						
esta: prenoc. Bite:	V.Tuville	11,015		.079	160	187						
S Inservicements 	1				July	ng dang Sua	uten Teal					
Barbacks Barbacks				Linerita Tepl Viria					light Soul	(0)(e)		
KUL MARINE (A-				27	1		-		EW.	in Sur	DR Seriers Silve	61 E
	ENDERHISENING	Salari	1294	7.	31.	stga	1	34 29 M	Elegon	Mester 155	Canal Canal	See.
	(i.hchiel	Assured Assured	tional "		300		- 1		47/2		1 200	
Y D FRANKLEY IN		personal.				11,000	300	177	1777	100	-26264	104

#### **Decision** making

It is known that the value of sig. (2 -tailed ) is 0,000 < 0,05.so, It can conclude That there is significant difference between the result of learning English in the class A class B scores.

The other ways can be done to detect the significance through the comparison of t count and t table

But the significance 2 tailed is effective and accurate enough to find whether there is significance difference or not.

# 11. DATA ANALYSIS OF EXPERIMENT AND CONTROL CLASS FOR THESIS WITH SPSS [GUIDE 1 OF 5]

## **BASIC CONCEPTS OF RESEARCH (Thesis)**

Thesis title:

The Effect of Problem Based Learning (PBL) Learning Model on Student Learning Outcomes in English Subjects "Genre Texts" Material.

Formulation of the problem

1. To what extent does the Problem Based Learning (PBL) model affect student learning outcomes in English Subjects "Genre Texts" Material?

2. Is there any difference in student learning outcomes in English Subjects "Genre Texts" Material between problem based learning (PBL) and conventional learning models?

## **Research methods**

1. The research design used a quasi-experimental.

2. Collecting data using tests (Pre-test and Post-test in the experimental class and control class).

3. The experimental class applies the PBL learning model while the control class applies the conventional learning model.

## **Research Data Analysis**

- 1. Descriptive Analysis
- 2. Normality Test
- 3. Paired Sample t Test (if the data is normal)
- 4. Wilcoxon test (if the data is not normal)
- 5. Homogeneity Test
- 6. Test Independent Sample t Test (if the data is normal)
- 7. Mann Whitney test (if the data is not normal)

#### **Basic Concepts of Descriptive Analysis**

Descriptive statistical analysis is useful for describing and describe research data, including the amount of data, maximum score, minimum score, average score, and so on (Ave, 1999; Everitt & Skrondal, 2006; Field, 2005; Friedrich et al., 2017; Garth, 2008; Jackson, 2009; Sharma, 2017; Singh, Kumar, 2006).

Results of Descriptive Analysis with SPSS

	De	escriptive St	atistics		
	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Experiment	22	57	78	68.77	6.332
Post-Test Experiment	22	81	93	86.55	3.582
Pre-Test Control	22	56	85	68.55	7.915
Post-Test Control	22	68	90	78.55	5.369
Valid N (listwise)	22				

# [GUIDE 2 OF 5] EXPERIMENT & CONTROL CLASS DATA ANALYSIS FOR THESIS WITH SPSS

## **RESEARCH DATA ANALYSIS**

- 1. Descriptive Analysis (v)
- 2. Normality Test
- 3. Paired Sample t Test (if the data is normal)
- 4. Wilcoxon test (if the data is not normal)
- 5. Homogeneity Test
- 6. Test Independent Sample t Test (if the data is normal)
- 7. Mann Whitney test (if the data is not normal)

#### THE BASIC CONCEPTS OF THE NORMALITY TEST

1. The normality test was conducted to determine whether the research data were normally distributed or not.

2. Normal data is an absolute requirement before we perform parametric statistical analysis (paired sample t test and independent sample t test).

3. In parametric statistics, there are 2 kinds of normality tests that are often used, namely the Kolmogorov-Smirnov test and the Shapiro-Wilk test.

	163	ts of Norr	nanty				
	Class	Kolmo	ogorov-Sm	irnov <sup>a</sup>	s	hapiro-Wi	lk
		Statistic	df	Sig.	Statistic	df	Sig.
	Pre-Test Experiment (PBL)	.133	22	.200*	.945	22	.250
Learning Outcome	Post Test Experiment (PBL)	.121	22	.200*	.948	22	.291
Result	Pre-test Control (Conventional)	.109	22	.200*	.965	22	.591
	Post Test Control (Conventional)	.166	22	.118	.955	22	.396

Tasts of Normality

#### NORMALITY TEST RESULTS WITH SPSS

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

#### NORMALITY TEST INTERPRETATION

1. Based on the output above, it is known that the significance value (Sig.) for all data both on the Kolmogorov-Smirnov test and the Shapiro-wilk test > 0.05, it can be concluded that the research data is normally distributed.

2. Because the research data are normally distributed, we can

using parametric statistics (paired sample t test and test

independent sample t test) to analyze research data.

# [GUIDE 3 OF 5] EXPERIMENT & CONTROL CLASS DATA ANALYSIS FOR THESIS WITH SPSS

## **RESEARCH DATA ANALYSIS**

1. Descriptive Analysis (V)

### 2. Normality Test (√)

- 3. Paired Sample t Test (if the data is normal)
- 4. Wilcoxon test (if the data is not normal)
- 5. Homogeneity Test
- 6. Test Independent Sample t Test (if the data is normal)
- 7. Mann Whitney test (if the data is not normal)

#### PAIRED SAMPLE T TEST BASIC CONCEPTS

1. The paired sample t test is used to determine whether there is a difference in the mean of two paired samples.

2. The requirements in the paired sample t test are data with normal distribution. (based on the results of the normality test in the previous video concluded that the research data is normally distributed)

3. For homogeneous data variance is not a requirement in the paired sample t test.

4. The paired sample test in this study was used to answer the problem formulation "To What extent does the Problem Based Learning (PBL) model affect student learning outcomes in English Subjects "Genre Texts" Material?

5. To answer the formulation of the problem, the paired sample t test was carried out on the experimental class Pre-test data with the experimental class Post-test (PBL model). Then the control class Pre-test data with the control class Post-test data (Conventional model).

#### **RESULTS OF PAIRED SAMPLE T TEST WITH SPSS**

			Pa	aired Differe	nces		t	df	Sig. (2- tailed)
		Mean	Std. Deviati on	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair	Pre-Test Experiment -	-17.773	7.764	1.655	-21.215	-14.330	-10.737	21	.000
1	Post-Test Experiment	-10.000	5.855	1.248	-12.596	-7.404	-8.010	21	.000
Pair 2	Pre-Test Control - Post- Test Control	-10.000	0.000	1.240	-12.030	-7.404	-0.010	21	.000

#### Paired Samples Test

### PAIRED SAMPLE T TEST TEST INTERPRETATION

 Based on the output of Pair 1, the value of Sig. (2-tailed) of 0.000 <0.05, it can be concluded that there is a difference in the average student learning outcomes for the Pre-test experimental class and Post-test experimental class (PBL model).
 Based on the output of Pair 2, the value of Sig. (2-tailed) of 0.000 <0.05, it can be concluded that there is a difference in the average student learning outcomes for the pre-test control class and the post-test control class (conventional model).
 CONCLUSION

Based on the discussion of the output of Pair 1, it can be concluded that there is an effect of the problem based learning (PBL) learning model on student learning outcomes in English Subjects "Genre Texts" Material?

	F	Paired Samp	les Statistic	S	
		Mean	Ν	Std. Deviation	Std. Error Mean
Daind	Pre-Test Experiment	68.77	22	6.332	1.350
Pair 1	Post-Test Experiment	86.55	22	3.582	.764
Dair 2	Pre-Test Control	68.55	22	7.915	1.687
Pair 2	Post-Test Control	78.55	22	5.369	1.145

#### **DESCRIPTION STATISTICS RESULTS**

SPSS PRACTICE: Open the data "Untitled Descriptive Data.sav"

# [GUIDE 4 OF 5] EXPERIMENT & CONTROL CLASS DATA ANALYSIS FOR THESIS WITH SPSS

#### RESEARCH DATA ANALYSIS

- 1. Descriptive Analysis (V)
- 2. Normality Test (V)
- 3. Paired Sample t Test (if the data is normal) (V)
- 4. Wilcoxon test (if the data is not normal)
- 5. Homogeneity Test
- 6. Independent Sample t Test (if the data is normal)
- 7. Mann Whitney test (if the data is not normal)

#### **BASIC CONCEPTS OF HOMOGENITY TEST**

 The homogeneity test aims to determine whether a variance (diversity) of data from two or more groups is homogeneous (same) or heterogeneous (not the same).
 Homogeneous data is one of the requirements (not an absolute requirement) in independent sample t test.

3. In this study, the homogeneity test was used to determine whether the variance of the experimental class post-test (PBL) and control (conventional) post-test data was homogeneous or not.

#### HOMOGENITY TEST RESULTS WITH SPSS

	Test of Homogene	ity of variance			
		Levene Statistic	df1	df2	Sig.
	Based on Mean	1.038	1	42	.314
	Based on Median	1.037	1	42	.314
English Learning Outcome Result	Based on Median and with adjusted df	1.037	1	32.319	.316
	Based on trimmed mean	1.037	1	42	.314

#### Test of Homogeneity of Variance

#### HOMOGENITY TEST INTERPRETATION

 Based on the output above, it is known that the significance value (Sig.) Based on Mean is 0.314 > 0.05, so it can be concluded that the variance of the experimental class post-test data and control class post-test data is the same or HOMOGENOUS.
 Thus, one of the requirements (not absolute) of the independent sample t test has been fulfilled.

# [GUIDE 5 OF 5] EXPERIMENTAL & CONTROL CLASS DATA ANALYSIS FOR THESIS WITH SPSS

#### **RESEARCH DATA ANALYSIS**

- 1. Descriptive Analysis (V)
- 2. Normality Test (√)
- 3. Paired Sample t Test (if the data is normal) (V)
- 4. Wilcoxon test (if the data is not normal)
- 5. Homogeneity Test (√)
- 6. Independent Sample t Test (if the data is normal)
- 7. Mann Whitney test (if the data is not normal)

#### **BASIC CONCEPTS OF INDEPENDENT SAMPLE T TEST**

1. Independent sample t-test is used to determine whether there is a difference in the mean of two unpaired samples.

2. The main requirement in the independent sample t-test is that the data is normally distributed and homogeneous (not absolute). From the results of the analysis in the videos, the conclusions obtained are that the data is normally distributed and homogeneous.

3. Independent test sample t-test in this study is used to answer the research question: "Is there any difference in student learning outcomes in English Subjects "Genre Texts" Material between the problem-based learning (PBL) model and the conventional model?"

4. To answer the formulation of the problem, an independent sample t-test was conducted on the experimental class post-test data (PBL model) with the control class post-test data (conventional model).

## TEST RESULTS OF INDEPENDENT SAMPLE T TEST WITH SPSS

		for Equ	e's Test uality of ances			t-test f	or Equalit	y of Mean	S	
		F	Sig.	t	df	Sig. (2- tailed)	Mean Differen ce	Std. Error Differen	95% Cor Interva Differ	l of the
								се	Lower	Upper
	Equal	1.038	.314	5.813	42	.000	8.000	1.376	5.223	10.777
English Learning	variances assumed									
Outcome	Equal			5.813	36.602	.000	8.000	1.376	5.211	10.789
Result	variances not									
	assumed									

#### Independent Samples Test

#### INDEPENDENT SAMPLE T TEST INTERPRETATION

Based on the output above, the value of Sig. (2-tailed) of 0.000 <0.05, it can be concluded that there is a difference in the average student learning outcomes between the problem based learning (PBL) learning model and the conventional model.

#### **DESCRIPTION STATISTICS RESULTS**

	Group S	tatistics			
	Class	N	Mean	Std.	Std. Error
				Deviation	Mean
English Learning	Post-test Experiment (PBL)	22	86.55	3.582	.764
Outcome Result	Post-Test Control (Conventional	22	78.55	5.369	1.145

#### SPSS PRACTICE: Open the data "Untitled Data Homogenitas.sav"

# EXPERIMENT & CONTROL CLASS ANALYSIS STATISTICS PART 1 SPSS TUTORIAL & PRACTICE

# **EXPERIMENTAL & CONTROL CLASS ANALYSIS : Descriptive Analysis ,Normality test ,Paired Sample t Test For Thesis.**

Thesis title

The effect of Problem Based Learning (PBL) Learning model on student learning Outcomes in English Subject '' Genre text '' material.

1. To what extend does the PBL affect student learning outcomes in English Subject ''Genre Text ''

2. Is there any difference in students learning outcomes in English Subject "Genre text" material between PBL and Conventional model.

Research method

1. The research design used a quasi experimental

2. Collecting data using test (Pre test and post test experimental class and control class.

3. The experimental class used PBL Learning model, While the control class used the conventional learning model.

Research Data Analysis :

- 1. Descriptive analysis
- 2. Normality analysis
- 3. Paired sample t test (if the data is Normal)
- 4. Wilcoxon test (if the data is not normal)
- 5. Homogeneity test
- 6. The Independent sample t test (If the data is normal)
- 7. Mann whitney (if the data is not normal)

#### 1. Go to excel to type the Data

and the local data	and the second se		and the second		the second	(10.4	Carelynami Tale ar ser	- 6
11-1 4	Section	4 <u>8</u>	t die	9 J. 17 H	F. P.	- Silana	<u>a</u> <u>c</u>	and a second
						* *		

#### 2 Go to SPSS-Variable View

		 10404	The Transmission Part Transmission Part Transmission Part Transmission	1111	1 Dian	Ga Blas Blas Blas Blas	Manual Ma	1111
-	_							

2. Go to excel ,Copy and paste the data from Pre test until post test control class

10	teres . B				_	1		100	100 See				
The second second second					and the second second						*	•	*
1	1	- 2 -	1	-		100	- X.	4					

4 Go to SPSS - DATA VIEW PASTE THE DATA FROM EXCEL

-	and the second	-			_	_	_	-	_	-	_				_	-	
-	and the second se		Chillysoppi 194		100		1000			1000	1.1	1.100	100		1.00	And States	
	-000		10) 31() 10)		-												
	12		28.	100								_			_		
-						_			_	_				_			
-	10		1.1 H = 11.1											_			
-	100000																
-	1.546		14														
	177.0	100		- 11		_	_	_	_					_	_		
		- 50	10.	34													
	191.		11	30										_			
			100 141														
1		- 81		100										_			
1		94. 61	100	197										_			
	198	- 61	198	10													
	100		981 381 317	17 19 19													
6		50	#40														
	78	- 44		- 18													
1	12		21	10													
¢	. 94	- 40	100	11	_												
1		12											11				
	41.1	0 	100	1 2 2 2 4 W													
	- 42		607	17													
	14	14	int.	141													

5 FIRST Go to DESCRIPTIVE ANALYSIS

王亚目于	September 1		1 Sec. 11 194	10 10		
	Nor Description and Perspector Netter Restances Service Servi	El persona A Jana El presente Presente El Statuto El Statuto				
					 	_

MOVE TO THE DAILOG BOX ON THE RIGHT-CLICK OPTION -CONTINUE -OK

								Sector Contra
	H - 322 - 2 8 - 4 8 5 - 1 90	 	Discontant Citika men	20	Colloguese Cheffan (n. 1995) Anno Mariana Mari			
11. 14.	341 - 6							

THE RESULT OF THE DATA DESCRIPTIVE ANALYSIS WITH SPSS

1	l de ésplores especialiste d'acces			ni Arge g					- 3. 3
CHAR /				- 2		4 4	+		14
a Bin Bin Minute Mare Date Date Date Date Date Date Date Dat			urfager Trefts	tea) Garlanta	•				
		The Party of the P	Margari L. Mar	· The Farmer					
	Free Test Contract Proof Test (Contract) Prior Test (Contract) Prior Test (Contract) Test (Contract) Test (Contract)	11 11 11 11 11 11 11 11 11 11 11 11 11		17 6201 74 7360 88 7360 88 620					
C Carbortow		0				A		Same	and the
Carbon to the			2 Y	See Street				Color States	ana ana

SECOND , GO TO NORMALITY TEST CLICK AND TYPE ON THE VALUE ONE BY ONE

	Taxast di Taxast di Taxast di	
H		The second secon
		Land Contraction (19)
		Cancel Cancel Connect

GO TO EXCEL COPY AND PASTE ONE BY ONE FROM PRE TEST (EXPERIMENT) TO SPSS

			18.224				113		nie (					10.14	10.00	-	- 65
10	(2Dar) (2Dari		1 / 1/ H-			22.0	- 72	(Break)	жř,	21 14111		a unita Angli	14	1.1	6.5		Щ. 1415
1	and the second second	Section 1				1241214	5.3			18.1		н.		9		(4)	÷
Ē		-	-11	- 10		****	1	100,000,00	****								
F			- E-	n			1		- 21	_	_						
Ŀ			10 10	an a sur a	32.	1.1	100		- 30								
E				12		1.1			- 31	_							
Ŀ		4	10	100			1		- 21								
Ľ		-	-	10			1		1								
Ľ			10.						1								
ŀ	I I I I I I		AC	1.1.1.1		1 3	100		- 21								
ŀ	2			- 22			100	- 20	- 2								
Ľ	10	1		36	0		5	- A.	1.								
μ	10						1		- 1	_			_		_	_	_
ŀ	1200		-				2.1	_	-22								
L	100				10	1. 1. 1. 1.	1	- R.	1								
L	-	340	44				1		1.1								
L	- 24	1	- 2-	- 25	20		1		- 1								
h					-		1	1	- 21		-					_	-
		5	10	11			1		4								
L	1.0																
		States of the local division of the local di							14.96								
I.	hereast as					The second second second		-		2.5				page a		-	
1	12 30	i ben it is				. · · ·		10000	101	1.00				-	1.4	a series	

PASTE ON RESULT

		ALC: NOT THE OWNER	1 834	an over 1	and the second second		ALC: NAME	- 10 mil			100					
	Challen T	findings.	Protostal 1	Contrast 1	These 1	Time.	-		To the l		-	Constant of the	-	-		1
		100			10.00											_
	E D	- 100	1000 C 100	100	100											
	10	100	- 22	100	30											
		1.1.11	10.010.01	100												
	11	1.10			- 11											
	11 44 31		1.00	10												
	-10	14		1.01	(11)											
	-Y	- 17	- N.													
	PL		1	CALLER.												
	88	100	·	- 10												
	1	100	10.00													
				191												
	-	- 281							_			_	_	_	_	_
	100 17				10											
		- 7	1.1.1.1.1		10											
	100				10 H H											
-			D		- 21											
-	- 2			-												
					- 2											
	87.	1.4.4.4	1.1.1.1.1.1	1.1												
				- 2												
					-											
-	The second second				-	_	_	-	_	-	_	_	_	-	_	_
	Constant State	_			_	_	-		_				_			

#### COPY AND PASTE CLASS FROM EXCEL

- 10 hour		1.16.0														
1993		-			3	Partes		the local state	1940	10	1.0	. 90	36	ж.,	8	. 1
1	-	-	-		100 100		-		+							
-	10	0 10 17	1		13. 80 84			1	1							
1	27 11	10	10				-	1	1							
90 10	2.1.1.2	0 8 8	11		1				1							
10 10		-	2.2.2.2				-	10	-1-							
44. 201	10. 11. 12.	10 10 10	10 11 12				1		1							
11	97 10	01 11	11		10 C		1	1	4							
-	-	10 40 10	1		11		1	1	4							
					-			1.	1							
		-		ă.	-	1 S U			0 1		and the second second	- 194 - 1941		in in a	-	-
		-1) -3 10	in the s		-	an ' Antaria			0 4	*.•	and the second second	States and the second		14/11		-
-			30 A.	30	N					*.•	and the second second	States and the second				
					N	an ' Antaria			0 4	*.•	and the second second	States and the second				
			X14.		N NIN				0 4	*.•	and the second second	States and the second				
			A. Land	The second	N NIN				0 4	*.•	and the second second	States and the second				
		+ + + + + + + + + + + + + + + + + + +	A Branness	The second second	A DESCRIPTION OF THE OWNER OWNER				0 4	*.•	and the second second	and the second se				
			M. L. Streamer	The second second	A CALCULATION OF				0 4	*.•	and the second second	and the second se				
			N	The second second	NUMBER OF				0 4	*.•	and the second second	and the second se				
			A DESCRIPTION OF	W CONTRACTOR OF	NUMBER OF STREET, STRE				0 4	*.•	and the second second	and the second se				
			M	The second second second	MULTINGER ALTER				0 4	*.•	and the second second	and the second se				
			A BERNSTERVISION	The second second second	MULTINGEN COLUMN				0 4	*.•	and the second second	and the second se				
			M	The second second second	NUMBER OF TAXABLE PARTY				0 4	*.•	and the second second	and the second se				

#### FOR NUMBER 23 RESULT COLUMN IN SPSS COPY AND PASTE FROM EXCEL POST TEST (PBL MODEL)

ちの正確認わり			half and the	And March 1	and then 1	the local			10.01	
de los	and the second	68. TH.	69 B	N. Seed.		Bridger	- X	1.50	A.	11
e din tine Historie B. J. Lie	新新校·1	1412.23	2.10 10000	· · · · · · · · · · · · · · · · · · ·	1.11	g thereas	1440	e sala	in file;	167 ( )
C (0,41	+									
and sectors.	-	8			n X I			35		•
100	10 11		and the second		1					
		41 44 32			1					
3	-	10	-1-1		1					
8 3	46	5			1					
		81		-	- 2					
8 8		14 44 44			- 1					
3 3	- 5	10	-1-1	- 81	- A.					
- 3 - 3	10	8	-1-1		- 3				_	
	-	10	1.1		1					
1		22	-8-8		1					
1 1	* 1		1.01	1						
7 N		**			- 19 - I.					
		0 = 0	1 5 <b>U</b> -		20 A		24- 1 • H			-
to be been to	nine nine treatme	00.200-20	e fatura di ce		0.6	Statement of the local division of the local				-
to be been to	nine nine treatme	00.200-20			0.6	Statement of the local division of the local				
	E Ad	ou ant at 10 M T	e fatura di ce		0.6	Statement of the local division of the local				
	E Ad	10 H 1		10 B.	0.6	Statement of the local division of the local			•==	
	E Ad	10 A 1			0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad			н» В Д о	0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	
	E Ad			· Han	0.6	Statement of the local division of the local			•==	
	E Ad				0.6	Statement of the local division of the local			•==	

AND THEN, GO BACK TO EXCEL COPY THE CLASS (PBL MODEL ) TO SPSS IN CLASS TABLE.

е. с. в.А.з.				
free parts parts and		110 Bar 908 848	* * * *	
		1 1		
E 12. 46 . 15	N	1.1		
	1	1 1		
	1 11	1 1		
		1.1		
		1.1		
C 3 4 5	1 1 1 I	11		
6 44 65 44	-	A. 4		
		1 1		_
ନ୍ତ୍ର କ୍ର		1.4		
and the second se				
the in provide linearity				
Andrew State	and also mays down	0.8-015	•5: -42+H	-
Andrew State			•5: -42+H	-
			•5: -42+H	
			•5: -42+H	-
			•5: -42+H	
			•5: -42+H	
An			•5: -42+H	
An			•5: -42+H	
An			•5: -42+H	
An			•5: -42+H	
An			•5: -42+H	
An and a series of the series			•5: -42+H	-

AFTER THAT GO TO EXCEL COPY THE PRE TEST (CONVENTIONAL MODEL ) AND PASTE TO NUMBER 45 IN RESULT COLUMN

	and the second s	- + (+			III III		
Xu A me	a strate of the second	100 W 100	a data the bar	Statistics.	Y 0	山田	11
U	1-4-4-2.2.2	10 A. 400 - 40	0.8724	an Master	famor same	114 (ML)	inter a
a - 4.6 a							
		B B 1	1.	10.1	0.36	0.118	1.1
A REAL PROPERTY OF A REAL PROPER	and the second se	Contract Contract (	NAME OF STREET				
1 2 2 3		-1-1-	1 1				
(4) 11 10 10		1 1	1. 1.				
1 1 1 1							
A 11. M 10			1.1				
12 23 55 55	14		1 A.				
<b>N R 1 1</b>			1 A .				
	18	1 1 1	1 A				
	1	1 1	1 1				
		1 1	1 1				
0 0 0 0		3 3	8 B				
		1 1	1 1				
HHHH		10-21					
A A A A A A A A A A A A A A A A A						EKKOP	
A A A A A A A A A A A A A A A A A							
				• • •	940 - A.B		
					940 - A.B		1
and a second sec				• • •	940 - A.B		-
and a second sec				• • •	940 - A.B		-
				• • •	940 - A.B		-
A A A A A				• • •	940 - A.B		-
an a a a a a a a a a a a a a a a a a a				• • •	940 - A.B		-
A A A A A				• • •	940 - A.B		-
				• • •	940 - A.B		-
A A A A A A A A A A A A A A A A A				• • •	940 - A.B		-
				• • •	940 - A.B		-
Image: All states       Image				• • •	940 - A.B		-
Image: All states       Image				• • •	940 - A.B		1
Image: All states       Image				• • •	940 - A.B		1
Image: A state     A       Image: A state     A <td< td=""><td></td><td></td><td></td><td>• • •</td><td>940 - A.B</td><td></td><td>-</td></td<>				• • •	940 - A.B		-
				• • •	940 - A.B		

	FAG-				Chill.			. Market .	10. A		in the second				1 10		100
Sec. 1	1 mar 1		1.00		- 00 M	1.000	140	-		int i	(Colored	1.00		1		1 22	11
the st	1.1.1	0.00.1	1.4.1	新加速	定法具	Anna	49.1	0.8.1	24	in the second	12 min		- Artic	-	the set		
	1.044			1.2			100			i ye are		-	110	14.1	1.11		
Send.	Part Sel	Pro Section	Part Not		. Partes	Part for		Participation in	in the l				2.0				
100	44		1	-		1		1	201								
	-	ē		144		1		1	- 6								
÷		40	¥			<u></u>		- 1	- 11-								
	10	W	11.	100		1		1	- R.								
1	24 10	11. 17	1	100			-	1	- 6								
1	10		31.			1			i.								
98) 10		55 10	10	-		1-1		2	1								
14	201 C	÷.				1. 11		1	1								
34C 44	24 88	61. 64. 69.	<u>c</u>	11		6-1		1-2	- 21								
10.	H		31.	10		12.1			÷.,								
88. 177		81. 191	а. т.	1		1-1	-		- 2								
10	1001	**	187	-		1			4								
	10 10		2	10		1-1			1								
11. · · · ·		1.	101			1			4								
				100		1 I		the second se									
	100 - 1 100 - 100 - 10 100 - 100 - 100 - 100 100 - 100 - 100 - 100	in the second of the		0) =	<b>10</b> 5	U -	-								e i i	1674	
	100 - 1 100 - 100 - 10 100 - 100 - 100 - 100 100 - 100 - 100 - 100	-		= 0 M			-		Ö						_	6.2	Hone of the second s
-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101		= 0 M			-		Ö							6.2	
Ha	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	1
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	H
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	and and a
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö							6.2	H
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	-
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	H
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	H
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	H
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	H
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	H
Ha	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/101					-		Ö						_	6.2	and and a

GO TO EXCEL COPY POST TEST SCORE (CONVENTIONAL MODEL TO SPSS.

			+ (624)	0.01	Tree!								10.4			$-\phi_{1,2}$
		合王相()				et below to		-						2.0	1940	63. A
10	26.74 121000	40. 100	Sec. 1	Sec. 1	64) 73 140 73	1. 日田 田田	N. And	Mari	- E	1. 18 14	de artiset	1.17	1.13	1.1	12	H
10.00	(25mg	tions . B.	C TRANSPORT	Sec. 19-13	- Alto - 200	1226		CHOLDS	-	en this	Arris -	-040	17.540	ter fil	1994.18	uiter in
	14		1616													
100	100		1999 B			1.		1.1.2	14	1.00		14	1.1		14	121
1.00	C. Perm	6		1.000	-				1 A 1	1.00		- 77	1	-		2.0
	1401	1	10 10 10 10 10	1.000		11111	1	1000								
21	1	1	- 2	Faret	- 2			1								
1		10	- R	- 5	25	······································	£	1		-						
	2	14		-				1 - 1								
1	- 10	10	10	44		- X - 1	8	1								
2	1	1		1			1	4								
	100	10	N.		1	1	1	1	6							
	10	16		- 10	<u>1</u>		f	5.00		-						
	0.0			1110			2	8. 3								
1	111	-11-		- N.	M.		L	1				_		_		_
	100 100		-		22		<u>.</u>	- C - C								
	10	- 11				1.1		R - 3								
	-	10	- 22	- 22		1.00		1								
	1	100		-	19	1.1		N 11								
	-	1			-		8	4 3		_						
	1		-	-				2	1							
		-						1.47								
U.					and some statements					- 51		100	1000	-		+ 22
	A.260	Seal ( Seal)	6 C		0	<b>m</b> 5 V •						1.00			10 and 10	10 B

				2.6						line a	a hara ta
and the second second	Int Incess Parters	Barris I Barris	 1.00	-		-		-	-	100	
	and the second second second		 		-					1000	
		-									
		10									
	-	1									
	_										
		-2		_				_			
		-									
		- 14									
		198									
		1961	 	_				_			_
		10									
		- 10									
	ALC: NOT THE	1.4									
		181									
			-	_	_		_	_	_	_	_

					_			_		i an	
Sulge Follo	e Belletet, Dollaret	C Read C	1000	1.00	 - m-				-	 	
			1								
		10	1								
	4 6 6 6	1.5									
			- 15								
2	A	1	1.1								
			10								
		-2									
		1									
i de la companya de la	1	- 11	- 2								
		-	- 3								
· · · · · · · · · · · · · · · · · · ·			14	-	 _	_					
			- 4								
		# 1 N A									
		14									
	A	10									
			- 4								
				_	 _	_	_	_	_	 	

#### GO TO ANALYZE NORMALITY TEST-

正の目で	approximate and a second	A DESCRIPTION OF	Can been	339		CALCULATION OF
Neiger Ardun		Algan Algan Birras Birras Alganas				state of the local division of the local div
	Brook Martin					
	Badda telanor Badda telanor Correctionates Badda telanor Correctionates					
	April form	1				

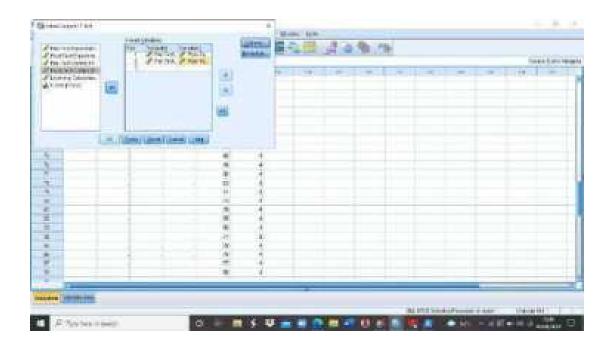
Telan Andar Decent.7	And and the set of the

	No Amate Son Co			_	
	III. TYONG NEW	14			
alas ital	The Barry Street	1949			
	Anna an				
	Tellar				
in the second	Her Ball Property Street Prope				
Contractions Info of the Descent of the	No. 10		1		
	Table of the same				
	Lange and the second second	The line	14		
Silver	10 20 300	100	128		
	20-1 200	100 I I I I I I I I I I I I I I I I I I	30		
10 10 million and the second second		H 23	396		
a Unite Ballarerise					
A succession of the second					
PRODUCT AND DECK	(Sector)				
Barrand Coal Prod					
And Instant with the	CO. Non-ball Lott (100). Not				

THE CONCLUSION IS THE DATA DISTRIBUTED NORMALY

THIRD GO TO PAIRED SAMPLE T TEST (DATA IS NORMALLY )

王》目了一	Operation in maked of the	支援の		
	1994			financia de arro rem
	Numerican and a second	Elitere		



• 15 August								
	-	- Mainten						
	144.40			11				
The Annual Section of		181	1.11	1.000				
Part Industrial	10.0	11	i ante	100				
Fast targene			1000	100				
No. Particularia Ref Conservation No. Conservation No. Conservation	601117		10					
			Anthony	e fae		-		_
	1		-	TTRUCTORES	inine and Series		2	-
Section Section 199			1. 1.00	1.2.24	11.68	40.00	20	- UAR
	Carl Hanna		1.1	1000	100	Same .	1.2	100

#### CONCLUSION

Based on the discussion of the output pf pair 1 It can be concluded that there is effect of the problem based learning (PBL)ON student learning outcomes in English subject " Genre test" material.

	P	aired Sample	es Statistic	5	
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test Experiment	68.77	22	6.332	1.35
	Post-Test Experiment	86.55	22	3.582	.76
Pair 2	Pre-Test Control	68.55	22	7.915	1.68
	Post-Test Control	78.55	22	5.369	1.14

### PART 2 EXPERIMENT & CONTROL CLASS DATA ANALYSIS :NORMALITY TEST & HOMOGENEITY TEST , INDEPENDENT SAMPLE T TEST.

Part 2

#### 1. Go to the data excel from part 1

1		11.6												
1				4	13		1.0	100	1.0	-	7 ( CB		1.6	0.9
4	ALC DESCRIPTION	And Provide Street	Barlas	ter a specific terms		Res fault	day for		Contraction of the local division of the loc	And Inc.				
	17 - 16 16		ĝ	- 2 -		1.			14	4				
	10	- 10	24				1.2		- 16					
1			10 10 20			1								
	10	10	10			1.1								
	28		28.1	100		1.1								
		18	- iii			1.1								
5			19			- A-			-					
	100					100			- 12					
	-	100 C					1.1		100	-				
2									-2-	1.1				
1	17.12			5	-									
2					1-				-1-			_		_
10	10		34.	in .										
		1.1					1.0			1.1				
			-				1.0			4.1.1				
	- 2 -		-	10.00		1.1			1.1					
1		1711	100			1.1								
	- N.	100	100 C	10.0		1.0								
1	10	16	10	1		1.1			14	4				
					-				100					

#### 2,open the SPSS

Go To analysis spss practice .

「正参国で、王王を書	MERESE JOS TO	
	And Yest Mine Lines for Head And State Total And	n fa Naa Naa Naa
	Sprakrade a	
4	Mary Sector Sect	
Terrer and the second sec	CHOINER (HE)	
1211		<u> </u>
		Caral Proved & Low Clavarial

2. click and type in value 4 and label : Post test control class (conventional) -click OK

And
Statute a
- Ward Comments
Cardinate Card

3. Go to Data view , on column research there are Result and Class

11154	ator i these		-		-		1.00	 1.1				
1411		1										
		-										
100												
100												
-		_										
		_				_	_	 _	 	 _	_	-
- HI		-										
1												
the second												
		-										
		-										
-												
State State				_	_	_	_			_	_	

## 4. Move Copy the experiment class(PBL) POST TEST SCORE and then paste to SPSS

		FL AV	1.00												
	1.000	and the second se		41.5	1.0		1.0	100		- 10	2.60	100	÷.	1.0	1.0
	AT LOT A	Contraction of the local division of the loc	A distantia di State	terminal pays and incomes 2		( pression	man I Lands Valley		Contraction in Contraction	COLUMN STREET, BARRIES					
	the set	ALC: NO.	The feet	And Tayl		ALC: NO.	100.00		- the best	disc 1842					
ł		-		- 1-	-	-				and the state of the state					
211	10					1.0	1.2			-					
	10														
11	11	100	100			1									
	10	100.0	28	100		1.1			1.1						
	10		25			1.1									
	1	14	100			1.00				1					
	No. 1	-	1	100		1.			1.0						
÷.,	10			14											
63	100			5	_										
8.1	1	1.00	- M	- 15		- N.									
ŧ.,			10		-			_		-		_		_	-
4 6	11 (1)	-	X.	1		1000									
	10	1.1	2			1.000	1.0			100					
11			10			1.0				1.1					
1			- A -			1.0									
61	1	-		100					- C						
			84.	10.1		1.1	- 8		1.1.1						
8	-		12	1		1	1.0		1.0	4.1					
14/11	100														

5. COPY and Paste the Data class experimet class(PBL) POST TEST TO SPSS

	40 million 1		All have	al and	1.000	100		1000	16.0	and the second					-	
- 10 B B X =	Tanks.		1.11	-	100.000		100	- 1944	10.000	(Control)	100				m	
Diam text	B / 11	0-10-0	4.4-		12.44	100	1 0	10.0012	A parts	e Minimer	1.14	alle munit	manner	1 540		1000
						-	1.000			8						
	19.34	1.0	1.00		1.1		-			1160	1.6		0.11		101	1.14
a Constant	terte d'alla	The Party Name	and Party of Con	1000		of the second	COLUMN TWO		STREET, SQUARE,	the state of the local						
1	AND THE O	100 1001	100		1010	1	haar baar	1	- the fast							
1-2-	1	12-	- 20			1				1.1						
			196			1.										
1	1		1			10	1									
		1.00	-			-	- 3									
			100			10	1.		1.1	1.1						
2 · · · 2 · · ·			10			1.1	1		- 21-	1.1						
1 1		1.00	10			1	1			646						
1.1	- 10	100	10			1.1	-3-		_							
10 IV	88 85	10	19			20	- 1-									
	100					1.1			- 9 C.	1.0						
1 1	- 11-	-				1.1	12		- 2 -	1121						
		- 10				10			-8-							
			1.000													
1.1	1	1						- y	-		-				_	
	1	1	1			1.1			5.0	And in case of the local division of the	the second second	_				_
2 Jan 10	1		1	-				0	5.0		the second second	_			> 44	
		-	0	-	-	v			5.0	and the second se	the second second	_	- 4- ) 4- )		>	
		-	0	-	-	U				and the second se	the second second	_	-			
HAR		-	0	-	-	U			9: 19	and the second se	the second second	_			-	
		:	0	-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	
		:		-	-	U			9: 19	and the second se	the second second	_			-	

6.Go to excel copy and paste post test control class (conventional )to SPSS

94		100	and the second	EAL T				al and	H and	Bridgers	-	C3	8.7	1.77	11
124	and the second	1.00	181-19-19	- 4- 4- 1	12.2	1.10 1000	87 M B	- 現代に語	And in case of the local division of the loc	g States I	-044	607 A.M	Start Se	10.00	Polis
111		1.6	140												
66	27		ALC: NO						1.111	1.1.1	10.1	1000	1.12	1.4	
2. 1		100.000	THE R. L.	And used			And Person in case of	1.2	-	Performent -	2.1	100	1.0	1.0	
					1	Canada Presidentes	Contraction of the		1000	and the second s					
			100												
11			100						100	1.1					
	100		10.1			1.1	- 12								
	- 10	100	16			1.1									
4	10.1		11111			1.1				÷					
2.1	10.00	58	107			1.1									
8	10	80				1.1									
	1						- 8								
	- 16	. 54	7	10.1		1.									
	- 10 cm		10			100									
Y															
1			11 12 13 14	1					- 2						
2.4			- 2 - 1				_	_							-
	- 2 -	100				1									
2			2				1.0								
	10	1.1				1.0				4.1					
			100			1.1									
н÷.	10.00	10				1.10									
24		1	100			1.0	- 8		1.14						
	10					1			1.00	4.1					
14															
	1.1.1								1.1						

From line 23 until 44

													lines:	
		1.46 ·····				-		1.00		 	 		-	-
			_											
	10													
-	14													
8.1			_											
6	- M		_											
	10													
	-8-													
	-3-													
	-2-		_											
			_		-	_	_		-	_	 _	-		
	96		_											
	101521													
	18.													
1	18		_											
			_	-										
	- 72													
			_											
	100													
	-		_		_	_	_		_	_		-	_	_

6. Next , go to excel copy and paste the control class (conventional ) post test

1	CHER MANNE	10.36	20						14100						
	interior.	100	S	4.7	10.5	1.1	1.1	1.1	111	-	50 G	36	144	1.1	1
0	and the second	1.44	to be	and link	104	-	married.		-	Beauti Search		120	100		
61	10	2	1. mil.		1.1		1.1		24213	1					
01			12												
1		1	- 2						- 28	1					
			- 21-		-		- 1								
	1	5	- 6			100				1.1					
11		10	- 10	Ē		100				10					
	10.	1	10			1.									
	10	÷.							1						
8.	- 36	- 54	¥			1.1			1.0						
63	- 10 · · · ·		10	1.000			1.4			6					
2.1		100	100	- 1 -	-				1.81						
8.5	- 3	1		- 5					100						
		2	-2		-				-1-			-			-
20		100	- R.:			1.0				8.7					
1	100	-	100				1.0			100					
1	10	-	10	10		1				415					
63	10	1	10			4.1			100						
а.	1					. No.									
а.,	- M-	10	-		-	di .									
10	10	- 10	100	10					1.0	and the second					

N 11		
2 1		
1 N N		
F 14 - 5		
8 8		
H 4		
M 4		
16 F.		

## 7. Next, go to homogeneity test

## Go to spss -analyze -descriptive statistic-explore

「王安昌で」	approximated in the	A Department		100 1			 Tel tele
	Andream and a second se						
A			_	_	_	_	_

	54942 (* ) ***
Belan a	

8. move english learning outcomes to dependent list on the right Move class to factor list on the right

And then go to plot ,click power estimation for homogeneity test then click continue -OK

					-			-	
fight (	Const Theorem	antes (1999) Antes							
		Const Photosition Fight Constants	The second secon	Cong REALING	Concernent Anno Concernet Anno Concern	Comp. PDD://dista	Come Characteria	Comp. MDAXEBURA MDAX	Comp HDatastical

THE RESULT OF HOMOGENEITY TEST WITH SPSS

102	n	-				
200		10				
			104			
			14			
1.14		1194	-			
100		1.00	144			
1.						
			ner Maria	and the set	and the second	and the second

Homogeneity test interpretation

1.Based on the output above ,the value of sig(2-tailed ). Based on Mean is 0,34 > 0,05 ,so it can be concluded that the variance of the

experimental class post-test data and control class post test data is the same or HOMOGENOUS

2. Thus, one of the requirements (not absolute) of the independent sample t test has been fulfilled.

 Because the data is homogenous so , it can go to independent sample t test.

1	1-1-1		later finish here finis here finish	1 10	11	New Network Network	
		Sealerse.			-		
		- Walt	-1	(inter	a		
			- The fact the second	Contraction of the			
			-				
		_	LINC MADE	ineil			

## 10. Copy and Paste the data post test experimental class(PBL) TO SPSS IN DATA VIEW

			_	_		 		1.01	_	_	 	_		10.00	(iii)
		100			-	 		1.000		1.199	 1000	-	111241		
	2	_													
5.1	100	_													
T.	10.														
	101														
	2.	-													
	- 21		_									-			
	11	_	_	-		 _		_			 	-			
		-													
		-													
	ani Line Line														
	100	_													
	58.7														
	100 C														
	100														
	- 197.														
	100-		_												
	10.0	_													
		-													
-	1.0	_													
-	-	_	_	_		 -	_		-	_	 -	-		_	-

11.Go to the excel copy and paste the code post test Experimental class(conventional)

	diam'	1						1.1.0	1.1.1.1			 11.00		TTO AND	1444	
	-	1	-	1	-	11.00	-				100	 				
	100															
-	10												_			-
	1	- 1														
	10.1															
		-					_	_	_	_						
à di	- 10 80									_						
		- 2														
	in.	- 1														
	10.									_						
	100 100															
	100															
		- 1														
	100	- 2														
1.2	180	- 2														
	10.1															
	-															
	-				_	-	-	_		-		 _	_	_		-

12 then, go to post test the control class(conventional) Copy and paste to SPSS from the excel in column result of number 23 until 44

263 134	States of the local division of the local di															
-																
	1.1			_	11	126			- 11 m	-	100	1.0	(i) (i)			
17	New April	-	And Spin 1	100		-	Per Veral	Pasting		the last		1.11				
		-	1.100		10		1									
	1.6	1.0	1				1.	1232		1.1						
	1	1	1.2		n					- 5						
	- 64	- 41														
		1.2					1.1	1.1								
	1.800			1.1	88.)		1.1	122			1.12					
1	1.00	- 10	1.00		18. C		1. C	1.1		- A	1.1					
	1	1.4			-		100				100					
											1.4.1					
1		1	10		14		100				1997					
	- PL	. B.	8		19		1.1	1.1								
	181	1.00					1.1	1		100	1000					
					10		- 10-			- X						
6.02	10.0	- 44	- 44	1.11			1.0	1.1								
д) (45) (45)					0 =	-	5 0	-			- 4144 2 - 4144 2 - 414	-		4.6	0.0	100
	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			-	0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	
	1011			-	0 =	-	، ت ا	1. III		9.14		-				-
	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			-	0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	-
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			-	0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	-
				-	0 =		، ت ا	1. III	4.2	9.14	x (14) e	-			ir 1944	-
				-	0 =		، ت ا	1. III	4.2	9.14	x (14) e	-			ir 1944	17 1 (4)
	The lances			-	0 =		، ت ا	1. III	4.2	9.14	x (14) e	-			ir 1944	-
				-	0 =		، ت ا	1. III	4.2	9.14	x (14) e	-			ir 1944	-
	and the second				0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	17 1 (4)
	The second second				0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	17 1 (4)
	The Internation				0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	17 1 (4)
					0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	-
	The second secon				0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	17 1 (4)
					0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	-
					0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	17 1 (4)
					0 =		، ت ا	1. III	4.2	9.14		-			ir 1944	17 1 (4)
	and a state of the				0 =		، ت ا	1. III	4.2	9.14	x (14) e	-			ir 1944	17 1 (4)
					0 =		، ت ا	1. III	4.2	9.14	x (14) e	-			ir 1944	-

Then , back to excel data. Copy and paste code post test control class(conventional)

		1.00															
									11	-		1.1		10		1.0	1.0
	ine sect. 1	-	And then	the file			a final second	Nasi bia		- the bally -	- West Date						
1	100	-		54			1				1.58						
1	104	- 84	1				- N										
11	17	-	1.0	14			100	- 3-		1	-						
1							- N	- 8-			2.4						
1	1.60		10				- R	1		=11	1.45						
-							1			1.1	1.1						
10	100						1.1	1.1		1.331	1200						
12	- 2 -		1.2	1.1			100	- 2-		1.1	6.20						
-		- 10	100	14			1.	1									
12	10	88 10	10	14			-1-	-1-		- 5-	10.00						
100		100					1	1									
1	÷.	1	- 2				- 20				- 0.90						
											and the second second						
				100			-10-			- 8-							
		- 2	-	10.00			-te	-3-									
	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	***	1	Q.	-		, v				10.000	8 E +	_	_	6.6	62	
	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	***		Q.	-	-	, v			1			_	_	6.0	-	1
		***	1	Q.	-	-	, v	inter i proprie					_	_	6.6	-	1
	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	***	1	Q.	-	-	, v	inter i proprie		3 1 1 1 1 1 1			_	_	4.1	-	 
	The second	***	1	Q.	-	-	, v	inter i proprie		3 1 1 1 1 1 1			_	_	40	-	1
	The second second	****	1	Q.	-	-	, v	inter i proprie		3 1 1 1 1 1 1			_	_	-	-	1
	The second second	****	1	Q.	-	-	, v	inter i proprie		3 1 1 1 1 1 1			_	_	-	-	1
	and a state of the second	****	1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
I A MARKEN AND AND AND AND AND AND AND AND AND AN		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
I A I A A A A A A A A A A A A A A A A A		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_		-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1
			1	Q.	-	-	, v	inter i gang i		3 1 1 1 1 1 1			_	_	-	-	1

Then, go to SPSS (Independent sample t test)

Click analyze-compare means -Independent sample t test

There are a		allisti en	(ff) ( = 1 = 2 = 2	- 1.00	Contraction of the second
E internet	ú.	- 10			
Better	Determin	anter a			
	100		_		
	a married		_		
150	Talantina.2	-			
5 1	_		_	_	
- 2 - 1					

13. Move english learning outcomes to test variable(s) on the right and move the class to grouping variable on the right box. And then, click below box define group.

	and the state	7		343. Lanes	 1985 (C. 1996)		******	
		1						
		1		- 61				
	-	- GLAND		-				
				1110-00				
		Million også det å skal Bener til						
		Manual						
		112,4400	-			_		
	-	L. Lines	1.00 m					
31 U		La Carrie Land	iter det.					
		1		_				
	10	1						
	100	1						
design of the local division of the local di	-	12						

Based the code group 1 type code 2 for post test experimental class(PBL) Group 2 type code 4 for post test control class (conventional)

E.C.	Total Accession		10									
127.00	Part Constant											
n Binn El Tran	7-7-04											
and and they are the provident												
a Alexandre		2.22	-									
and the second		First.		min.	Section 1		1977	E .				
3	Trated splets	State of the	1.00	10.07	14		1.09					
ALC: NOT		Providence international inter	1	10.0	10	÷	1.665	1				
All the					in deput		and the second					
- Dieta banar				lan sina Pala sina	1000				states and	1676		_
-								No Contra		the Street	Contraction of the second	
	Train service.	Contractification of the second states		(8)	- 10	1111		- 10		1.88	1110	-
		Providence and the		11		144	1690	44	900	100	8494	- 1

There two outputs . Group statistic and independent sample t test.

Independent sample t test output.

rt See		1969				Calley South		Wintern Party	
		- 0	194-14	 11	DO COMM-	Officer.	H.Der-	1200	. 10
AND NO.	es Sconderer Structure Associations	3000	. 044	 - 4 101	- 10	1000	: (4N (3N	1400 1201	

The conclusion of Independent sample t test

Based on the output above ,the value of sig.(2-tailed) of 0.00 <0.05 ,it can be concluded that there is a difference in the average student learning outcomes between the problem based learning (PBL) learning model and the conventional model.

	·	· ···· ······························	2000 C	-	28	100 A 100	4.4	8.6	200	
A STREET	7-7esi (*******	999 199 199								
-		500	24	ave.	10.0644	March 1				
8.	Tota same	STATISTICS CONTRACTOR	-	- An an	1944					
A DECISION OF THE OWNER.		Professional International	1.100	10.00	1.040	100				

The conclusion of Group statistics , based on the score of post test using PBL model is increase.Mean 86.55.

So, PBL learning model is improve English learning outcomes.

## 12. PEARSON PRODUCT MOMENT VALIDITY TEST FOR QUESTIONNAIRE WITH SPSS

#### PEARSON VALIDITY TEST BASIC CONCEPTS

1. Validity test is useful to find out the validity or suitability

questionnaire used by researchers in measuring and obtaining research data from the respondents.

2. Research questionnaires are said to be of high quality if their validity and reliability have been proven.

3. Pearson product-moment validity test uses the principle of correlating each questionnaire item score and the total score of the respondents' answers (Everitt & Skrondal, 2006; Field, 2005; Garth, 2008; Rusydi & Fadhli, 2018; Singh, Kumar, 2006).

#### PEARSON VALIDITY TEST CASE EXAMPLE

**RESEARCH TITLE: "The Influence of Perceptions on the Importance of Self-Efficacy in English Students on the Improvement of Teaching Skills at PGRI Semarang University in the Academic Year of 2022"** 

The RESEARCH INSTRUMENT is a questionnaire in the form of a checklist using a Likert scale.

ANSWER SCORING:

Strongly Agree (SS) = 5Agree (S) = 4

Doubtful (RR) = 3

Disagree (TS) = 2

Strongly Disagree (STS) = 1

PRACTICE: Conducting a validity test for each item of the questionnaire on the Perception variable regarding the Importance of Self-Efficacy.

#### PEARSON VALIDITY TEST STEPS WITH SPSS

INPUT – ANALYSIS – OUTPUT

#### **BASIC DECISION MAKING FOR PEARSON VALIDITY TEST**

- Comparing the value of rcount with rtable
- 1. If the value of rcount > rtable = valid
- 2. If the value of rcount < rtable = invalid

The way to find the rtable value with N=20 at 5% significance is to look at the distribution of the statistical rtable value. Based on the distribution of the statistical rtable value, the rtable value of 0.444 was obtained.

◆ Taking the decision based on the results of the significance value (Sig.)

- 1. If the Significance value < 0.05 = valid
- 2. If the Significance value > 0.05 = invalid

#### PEARSON VALIDITY TEST RESULTS SUMMARY

Item No.	rcount	rtable 5% (20)	Sig.	Criteria
1		0.444		Valid

2	0.444	
3	0.444	
4	0.444	
5	0.444	
6	0.444	
7	0.444	
8	0.444	
9	0.444	

#### PEARSON VALIDITY TEST QUESTION

- 1. There is a theory which states that the way to find rtable is N-2, so which one is correct?
- 2. The rount is negative, but the significance is <0.05, what is the conclusion?
- 3. How to deal with invalid questionnaire items?
- 4. Can a questionnaire using true-false statements be tested for validity in this way?

#### TUTORIAL & PRACTICE PEARSON PRODUCT MOMENT VALIDITY TEST FOR QUESTIONNAIRE WITH SPSS

#### 1. Go to excel word type the data

		10	11.1												
				1.1	1	1000	. 4	1.0	1.1	1.1	1.00	 		100	12
den an	1.2	100	10,010	*****		the support		Sec. 1	Sec. 1	101011444					
	11	10.0		1.00		1.00	1.000	1999	1.000	100					
2.5	100			1.0	1.1	1.1	14	- 2-		- 2-					
		- 1-	1.0		10	1.1	1.	1.1		10					
						1.1	1.0								
		1				La faire	1		. 4	10.					
					1.	1.1.1	2.1	1.1		10					
			1.1			1000				10					
	-					14.1			- 4						
	100	- 2-	100	100	1.0	1	12	12		100					
Sec. 1	100	100	12.1	12.1	100	1.20	121	100	1.1	14					
10	100	1.0	1.6	1.1	100	4.	4	1.18		10 10 10					
10.1	1.0	1.0	- 6			4.5	1	1.4	1						
11						1.0	. 4								
	A	1.1	1.4	1.1		1.1			1.4	- 60					
	100	1.	100	1	1	1	2	1.0	1	1011					
	1.5	1.0	1.5			1.00	100	1.2	1.1	100					
	121-1	- 2-	1.0	1.5	-	1.1		1.5	100	90. 18					

Pearson validity test case example

Research Title "The Influence of Perception on the Teacher Students" Self -Efficiency toward the Improvement of Teaching Skills in Universitas PGRI Semarang in the Academic Year of 2022"

The Research Instrument is a questionnaire in the form of a checklist using a likert scale: Answering scoring Strongly Agree (SA)=5 Agree(A)= 4 Doubtful(D)=3 Disagree(Ds)=2 Strongly Disagree(SD)=1

PRACTICE :Conducting a validity test for each item of the questionnaire on the perception variable regarding the Importance of Self-Efficiency.Pearson Validity test steps with SPSS INPUT-ANALYSIS -OUTPUT

GO TO EXCEL- COPY AND PASTE XI 1 UNTIL XI 9 -PASTE IN SPSS

h	Read	See.	-	The stand of .	X	1	1	NA.		Patri	1 144	
	140	Sec.	and the second	in the second se	100.0	-line	Sec.		and the	The Barrison	North Co.	
	8. <u></u>	ALC: NO.	8			10.00	ine .		di Panti	distant in	No test.	
	10	Acres 1		Se		10001000	100	2	100.00	di terter	Sec.	
	**	10.000		W		and the second second	and the second s		24.0	di America	No. and	
	11-	Same .	10.1	÷		-	line -		10 M I	all best at	To work	
	14.6	-	10.00			These literatures	here .	<u>t</u>	State .	distant .	Ward .	
	47	Salara.		1		-18-19	her	a	SPAN .	distant of	No and	
	40	Summer .				Sec.	lines.		in the second	ALC: NOT THE OWNER	Notesti .	
	44	North Co.		*		The second second	iners.	1	B80	di berne	N YOU	
	Manager 1	include:	1	-46		Think .	344		64400	A. Sectores	New	
	-							1	Sec.	1000		
							-					
	-											
				-								
	-	_	_			_			_		_	
-								_				

And then Go to DATA VIEW. GET READY THE DATA

	-				-	-			100	-	-			10000	
				91	*	100		199 - C.	1.00	(and the second		-	 1.00		
	2				- 0	- 3		-							
		1	1.1		10	1		1	- 1						
1	2	1	1			4	1	- ÷.							
6 B	10	- N.	÷.,	1.1	1			1	1.1						
	10	10	1						1.1						
					- 1										
		4.		1		- 90				_			 _		
	-1-	1	- 1				- 1	- 6							
	- 2	-		1.0	- 2				-						
	- 20	20		1		1	- 20	20							
	1	- 2 -			- 2		-1	- 2	-						
-		1.	1	1											-
		81			1.1	1	- 8								
-	100					100									
	. 6	6	1.1		1.1	1.0	100	- E.	1						
	10.0	1	1	1.1	- 45	1.0	- A.	A							
	1.0	- 22	1		1.1		- R.	6							
	1.	- E -			1		- T.								
		-													
				_	_	_	_	-	_		_	_	 _		-

# After that copy and paste the data from excel word to SPSS in DATA VIEW

in the low have never inclusion data who where down	and the second	-		- 4	1.00		Datesa	
· · · · · · · · · · · · · · · · · · ·	ALC: NOT	1000	77.	en de la s	122	1	1.20	Щ. Ч
			10.0	(h -				
		-		-	- 10-			
	1.	_	_	Barriss 107.58	and prime of the	Transport of		_
	and the second	Sec. 1		F. 6.0	115	100	ALC: NOT	
	1.1			1 A.		-	A COMPANY	
	3 .			1-1-1-		100	1000	
				é. 6				
		15		<ol> <li>5.</li> </ol>		1.1	1. 1.	_t.
			1	50 B.		1.2	121 2	-
		5				1.		
		100	-	<ol> <li>A</li> </ol>		1.4		
		12	100	10 B	12		N. 1 1	1.1
	3 2	Re-	100	10 23	1221	12	0.00	100
CALC IN COLUMN TO A CALCULATION OF THE CALCULATION	- M	2		1 R	1.1	1.1		1 St.
			1	9. J.		1.0	1.0	
	1 2	1.2		21-24	1.25	1.0		
		11	14.5	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	1.91	1.5	1 1	
	10 A 10			1				
2		10-1	-	10 D	1.24	12.00		
	-	-						-
Name of Street, St		100.0	1111					
Instant Instant	to in	-	100	1000				+ 32
	-	No. of Concession, Name	Contraction of the local division of the loc		250 L	Contraction of	and the second second	or the local division of
1 F. Tarbarrier 0			- 10 C			11 (Pr. 1		

					_		-		-	The second second	1		-		Sec. 1	
			14	1		1.1	-	10 m			1000	1.00	-			
-		10.0			1	1	1	1								
	2	21	1.1		10	1.1	1	- 1								
	1	- 81			1.6	- 4	1	1								
	1	1	÷	1.1	1	- 4			- 3							
		10				4	÷.,		1.1							
	140	T.	- A	1		1.4	- E .	- A.								
		4.5		1		. 4.	- E .									
	- 15-	1				- 35	- N.	- 5-								
		5		1	1	- 22		1.								
-	100	1.0		1		1	- 20	27								
	- ÷	- 11-	-	1.1		- 31		- 27	-							
-		1										-		_		-
-		2.		1	12	- 4-	20	- 2-								
	-	4		1	12	- 20	- 20		1.1							
	APRILLAND	4			1.00	- 21	-	1								
	10	2.	1.1	1.4	14	1.0	1.0	1.								
	145	20	1	1.1		- 21	1.0	1.								
		4.1		1	10	- 10	11.1									
-																

### COPY AND PASTE THE TOTAL SCORE FROM EXCEL TO SPPSS.

	*	
		E
		-

And then , Go to ANALYZE - CORRELATE-BIVARIATE

王が同う	Departmental A		ज्ञ 🌃	6 0		1.27				
	194								100000	111 100
	Bernard and the					1.11.11		-		
	dever frigane	18 1820		1		-				
	Bernin Malatin Sayn Brannas Theo Thiosphy				1	1.1.1.1.1				
1 1	and the second of the second se					1				
	Consectionses Materialist gandalistem				4	114.4				
Canada and C			_	-	_	_				

Move the XI .1-XI.9 and Total score to the right dialog box.

1000 AL	
	A A A A A A A A
2 I I I	1 Andrew Andre
1 1 1	- 3
- A A E	1 2.5
	A A A A A A A A A A A A A A A A A A A
	4 / Service Colline
	A Marriel Categoriel Barne
	1 Tarta ford
2 2 3	
E E 1 I	a los televisiones
	I.m. Tensi (and town/200)
	1

## CLICK OK

OUTPUT

II. w	10 18	100	50	9		B	4 1	1.4	10	+ -	E
-		Column 1 a	- Sec.	Court 1	Calubate to		-			-	and the second
1		10.00	10.1			1000	11	1.1	100		COMPLEX AND
101	Tasta tryatta		- 40.1	400	- 184	- 14		111	- 107		- 1910
1	Mg (Shires)	12.22	12	08		196.1	114	100	100	80	144
	- B.C	100	10		1.119					- H.	
1.1	Personal (reserve)	104		417	100	-	144		1000	1.64	100
	Page 1 and 1 and 1	1.198.3		646	1.785		185		100	327.	100
and the second	· Balland	194	- 16	18	104	- 16	- 注意	1.108	10.0	- 59	
1.00	PLNID 10100011		1.00		1000	141			1.00		100
	ACCESSION 1	1996	3.4		1.04	1940	+0	1.081	100	202	342
harry and the second			- 14					- 18			
1.00	Frequencies and an	100		100	100	191	144			300	1.445
	46.014446	100	12	199	1.14	12	255	- 241	144	- 35	12
144	Income ( in section )	- 12-		100			28	1000	1.1	the second second	
140	Sections.		100	1.	1.00		140	100	100		100
	the summer	100	- 72	19	. 54	- G1	100	100	1.1	100	100
100	Same Smith of				199	- 10			-90	144	1000
	No.111minft	1.1	- 24	- 14	1.00	1.22	11241	1.10	100	1.42	-
		1. STEL		100	10	100	10	1221	1.723		1.1
111	Name (month)	-21	- 10		- 21				244	-24	100
	No chemicale	100	144	144	1.000	1.000	1.22		100	100	
	(T.1.1.577)	- 28	14	1	- 3	1		- R	10.1		
100	Banne States	12		42	100		- 20	1.1		And.	- 3
100	ALCO STREET	1000		28		111.	100	1.00		-	441
L	A CONTRACTOR	10	1.00	10	12		1.1	1.00	1.18	100	
1.44	Frank Install	100	100	100	100	10	194	1341	100	line i	
	No./Trates	104	100		1000	1000	111	100			And Inc.
Sec. Com	- A Contraction of the local sector	20.1	100	100	10	1.1	1.1	. 1	20	22.	11
1 and the set	Property incomentation	100	100	100		100	1000	100		300	-

Basic decision making for pearson validity test

Comparing the value of recount with r table

- 1. if the value of recount >rtable=valid
- 2. If the value of recount <rtable=invalid.

The way to find the r table value with N-20 at 5%

Significance is to look at the distribution of the statistical rtable value.Based on the distribution of the statistical rtable value,the rtable value of 0,444 was obtained.

Taking the decision based on the result of the significance value (Sig)

- 1. If the significance value <0,05 =valid
- 2. If the significance value >0.05 =invalid.

Go to the output in SPSS

		1 = =	1.4	9	× 12		<u>a</u> 1	4	14.	4.00	- 41 E	13
1				1	in in this						12	
			1.00	100	- 90		100	100	100	200	Transaction of	
10.1	Tradition (second late)		.81	12	189	dett.	105	100	345	100	100	
	The context	- All	.199	140	1.346	1.184	3.00	1.10	5.0	144		
			100	3		18	- 44		- 28	- 41	- 26	
-4822	F3002626100001	1.00	1.1	100	(100)	100	394.1		. 447	1.000	3447	
	Helmbergh	204		146	160	1.444	361	1.00	. 499.	1995	100	
		100	10		10.	. H.		- N.	14	- 1944 - 24 - 1940	1.00	
180	Protocol Constants	1.00	114		185	811	148	3.85	100	180	112	
	29 (Biologi)	104	101		383	100	186	180	1.468		- 2016	
	그 사람이 집을 알려요.		196		1.1	100	1.5.66		1.10	100	100	
- 40.4	Paramia Samalant		18.4	1.00			3.15	1985	98.8	. 1990	344	
	ing indexts	1.000.0	.136	124		1.44	100	180	1.148	1.000	- 100-	
	1.0		10		1.00	- 10	100		10	- 30		
-46.5	Weighter Statistics	1000	1276	1.11	161		1.66	100	100	1.00	110	
1.	UN Desired	1.000	10.0	444	10.4		3.00	110	1.16	- 104		
			- 561		100		- 18		14			
1000	Transistic a logistic t	141	250	1.0	6.16	100	1.1	346	100	784	200	
	Big Bisish	1944	362	100	444	100		124	444	412	and a	
	A CONTRACTOR OF A CONTRACTOR	1.1443	100	100	1.10	100	1.38	10	1.1.1.1.1.1	1.00		
1.41	Transfer a latent	180	101	1.00	100	111	144	100	100	225	1940	
	00.010440	1000	100	100	144	6311	100			1000	100	
		1.10	100	18	1.160	- 10	1.1963	- 90-	1.18	100	1.26	
100	Annual Countries	64.	24.0	100	-343	547	244	145		100	- 242	
	Ro Game	1.00		10	240	1.1	1000	100		100	144	
		100	10	10	1.1	1.1	18		1.1	100	10	
1000	Freedow Carolana T	1000		- 120		100	3.85	234	100	-	100	
	The opening	100	100	10	1.682	194	-440	12	1.446	100	100	
		1.1	1		1.100		1.100		1000	100		
Tobara and	A PROPERTY AND A	100	100	100	100		11			19		

#### Person Validity test results summary

Item no.	rcount	rtable	Sig.	Criteria
1	0,808	0,444	0,000	valid
2	0,530	0,444	0,016	valid
3	0,598	0,444	0,005	valid
4	0,641	0,444	0,002	valid
5	0,525	0,444	0,017	valid
6	0,592	0,444	0,006	valid
7	0,689	0,444	0,001	valid
8	0,690	0,444	0,001	valid
9	0,295	0,444	0,207	Invalid

Pearson validity test question

1. there is a theory which states that the way to find rtable is N-2 ,so which one is correct ?

2. The roount is negative, but the significance is <0,05, what is the conclusion?

3. How to deal with invalid questionnaire items?

4. Can a questionnaire using true-false statements be tested for validity in this way ?

## 13. CRONBACH ALPHA RELIABILITY TEST FOR QUESTIONNAIRE WITH SPSS

#### **CRONBACH ALPHA RELIABILITY TEST BASIC CONCEPTS**

- 1. Research questionnaires are said to be of high quality if their validity and reliability have been proven.
- 2. The reliability test was carried out after the questionnaire items were declared valid.
- 3. The reliability test aims to see whether the questionnaire has consistency if the measurement is done with the questionnaire that is done repeatedly.
- The reliability test can be carried out simultaneously on all questionnaire items in a research variable (Field, 2005; Garth, 2008; Jackson, 2009; Ostertagová & Ostertag, 2013; Rusydi & Fadhli, 2018; Singh, Kumar, 2006).

#### EXAMPLE OF CRONBACHALPHA RELIABILITY TEST CASE RESEARCH TITLE: "The Influence of Perceptions on the Teacher Students' Self-Efficacy toward the Improvement of Teaching Skills in Universitas PGRI Semarang in the Academic Year of 2022"

PRACTICE: Conducting a reliability test for each item of the questionnaire on the Perception variable regarding the Importance of Self-Efficacy.

#### **CRONBACH ALPHA RELIABILITY TEST STEPS**

➢ INPUT – ANALYSIS – OUTPUT

Item No.	rcount	rtable 5% (20)	Sig.	Criteria
1	0.808	0.444	0.000	Valid
2	0.530	0.444	0.016	Valid
3	0.598	0.444	0.005	Valid
4	0.641	0.444	0.002	Valid
5	0.525	0.444	0.017	Valid
6	0.592	0.444	0.006	Valid
7	0.689	0.444	0.001	Valid
8	0.690	0.444	0.001	Valid
9	0.295	0.444	0.207	Invalid

#### > PEARSON VALIDITY TEST RESULTS SUMMARY

#### CRONBACH ALPHA RELIABILITY TEST BASIC ASSUMPTION

According to Wiratna Sujerweni (2014), the questionnaire is said to be reliable if the Cronbach alpha value is > 0.6

Pallant (2001) states Alpha Cronbach's

value above 0.6 is considered high reliability and acceptable index (Nunnally and Bernstein, 1994).

#### **CRONBACH ALPHA RELIABILITY TEST QUESTIONS**

- 1. What if the cronbach alpha is negative?
- 2. How to deal with unreliable questionnaires?
- 3. Is there a theory which states that if the Cronbach alpha value > rtable, then it is considered reliable?

## TUTORIAL & PRACTICE\_ CRONBACH ALPHA RELIABILITY TEST FOR QUESTIONNAIRE WITH SPSS

Research Title :"The Influence of Perceptions on the Teacher' Self-Efficacy toward the Improvement of Teaching Skills in Universitas PGRI Semarang in the Academic Year of 2022"

Practice :Conducting a reliability test for each item of the questionnaire on the Perception variable regarding the Importance of Self-Efficacy.

Steps:

- 1. INPUT -ANALYSIS-OUTPUT
- 2. PEARSON VALIDITY TEST RESULTS

SUMMARY Open the Data view in SPSS from

the data yesterday.

N				1	11010		* *	
			- 1-					
			- 1-		0.00			-
		1 1	- 1-					
		1 1	- 1-					
1 1			- 1-	19 13	1			
4. 4	i				100 C			
	1				4			
N 1								
			1	1.	1.1.1.1			
4 1	1 · · · · 1	4 3			1 28			
5 5			100	1. A.	1 2			
					- C	 		_
- 21 - 1		- A.						
2 1		10 20	- 2	-				
2		12 2			- 41			
		1000		4				
8 1		2 2	-		1 22			
E 1	1. 1	1			1.1.1			

Go to ANALYZE -SCALE-CLICK RELIABILITY ANALYSIS.

and a set		MCFCMI		
			-	
	2000 Earth res.	2		

Next step, move the questionnaire to the right .

1 1 1			
A Directories		((000))	
an mini	Zeel Janes Rent Long	2	

Then ,click statistic

				5000 (1911
	2			
a a la composition de la compo			8	
The local and	0 =		0.0	A RENHD ST
Factoriant and particular and and B (B) (C) or the MA		-	0 1 0 • •	
F berkernen) no (n (none non nord) H (i) II) ← → X1Ån		- 	10 10 10 + H	- + C+ H 0

Click scale if item deleted and click continue

There are 3 outputs :

Case processing summary Reliability Statistic Item Total Statistic

the second s	in Th	KBM90			1. pm .	tran gran	are	-					×
Brook     B		ALL VAN			0 10 0	2.8	9 H		*	- 13			
	F	Gardinet.	New Solar Sales Sales Sales Sales Sales Sales	Saulai No. Saul	40000								
	100	The second second	10.000 - 10.000 - 10.000	San Printer	Colorest .								
	10	100	1000	100	Carlos Carlos								
	10.0	10.00	1128	101	100								
	10	10.00	- 注較	100	1.10								
	10	14.0	11.00	141	100								
	10.00	386	10.00		1.023								
	44	10.00	44,078	11	100								
10													
			-						401.072.0	Lines of Par	an 1	TIME	1
E Finishing			Q	10 1	U 📻		120	0.1		-			Ð

CRONBACH ALPHA RELIABILITY TEST BASIC ASSUMPTION :

According to Wiratna Sujerweni(2014), the questionnaire is said to be reliable if the Cronbach alpha value is >0,6.

Pallant (2001) states Alpha Cronbach's value above 0.6 is considered high reliability and acceptable index (Numelly and Dematein 1004)

index (Nunnally and Bernstein, 1994).

#### CRONBACH ALPHA RELIABILITY TEST QUESTIONS.

- 1. What is the cronbach alpha is negative ?
- 2. How to deal with unrealiable questionnaires?

3. Is there a theory which states that If the Cronbach alpha value >table ,then it is considered reliable?

#### Answer:

1. is the cronbach alpha is negative, but all of the items of the questionnaires are already decided considered positive(Valid). If items of Questionnaires are negative Or not reable but valid /positive in validity test, it cannot use in research analysis.

2.Need to construct new questionnaires ,make sure that the questionnaire easy to read and easy to follow so that, the respondent are able to think and to give the questionnaires.

3. There is view evidence that some researchers use this kind of theories that is used Cronbach Alpha value is more than 0.6, so the items of the questionnaire will be positive reliability.

## 14. N-GAIN SCORE TEST EXPERIMENT CLASS AND CONTROL CLASS DATA WITH SPSS

#### **BASIC CONCEPTS OF N-GAIN SCORE TEST**

- 1. Normalized gain (N-gain score) aims to determine the effectiveness of using a method in one group pretest-posttest design research and research using experiment and control groups.
- 2. Gain score is the difference between the posttest and pretest scores.
- 3. In a one-group pretest-posttest design study (experimental design), the N-gain score test can be used when there is a significant difference between the average pretest and post-test scores through the paired sample t-test.
- 4. While in the study using the experiment group and the control group, the Ngain score test can be used when there is a significant difference between the average posttest value of the experiment group and the posttest value of the control group through the independent sample t-tes (Everitt & Skrondal, 2006; Friedrich et al., 2017; Kim, 2017; Parthiban & Gajivaradhan, 2016; Singh, Kumar, 2006; Wilmot & Mansell, 2014)t.

#### FORMULA TO CALCULATE N-GAIN SCORE

N Gain Score =  $\frac{Posttest Score - Pretest Score}{Ideal Score - Pretest Score}$ 

Description: Ideal Score is the maximum value (the highest) which can be obtained.

#### N-GAIN SCORE CATEGORIES

N-Gain Score	Category
G > 0.7	High
$0.3 \le g \le 0.7$	average
G < 0.3	low

Adapted from Melzer (2008) Or

Percentage (%)	Category
< 40	Not effective
40 - 55	Less effective
56 - 75	Effective enough
> 76	Effective

Adapted from Hake, R.R (1999)

#### N-GAIN SCORE TEST CASE EXAMPLE

For example, we use the N-gain score test to determine the effectiveness of the use of cooperative learning methods on English learning outcomes in Recount Text material for the 11th-grade students of SMA-IT Al Fikri Semarang in the academic year 2022.

As for the pretest and post-test score data in the experiment class and control class, we can see in the following excel data.

#### STAGES OF N-GAIN SCORE TEST WITH SPSS

INPUT --> ANALYSIS --> OUTPUT

#### **N-GAIN SCORE TEST INTERPRETATION**

Referring to the N-gain value in the form of percent (%) and the descriptive output table, we can make a table of the results of the N-gain score test calculation below

	<b>N-Gain Score Tes</b>	t Cal	culation Res	ults
No.	Experiment Class		No.	Control Class
	N-Gain Score			N-Gain
	(%)			Score(%)
1	65.71		1	31.03
2	55.56		2	30.00
3	69.05		3	47.73
4	75.00		4	36.36
5	59.46		5	6.25
6	66.67		6	41.46
7	66.67		7	9.68
8	62.16		8	10.00
9	53.13		9	6.06
10	61.11		10	30.00
11	62.86		11	35.71
Mean	63.3969		Mean	25.8446
Minimum	53.13		Minimum	6.06
Maximum	75.00		Maximum	47.73

- Based on the results of the calculation of the N-gain score test, it shows that the average value of the N-gain score for the experiment class (cooperative learning method) is 63.3969 or 63.3% is categorized as effective enough. With a minimum N-gain score of 53.13% and a maximum of 75%.
- Meanwhile, the average N-gain score for the control class (conventional learning method) is 25.8446 or 25.8% is included in the ineffective category. With a minimum N-gain score of 6.06% and a maximum of 47.73%.

- So it can be concluded that the use of cooperative learning methods is effective enough in improving English learning outcomes in Recount Text material for the 11th-grade students of SMA-IT Al Fikri Semarang in the 2022 academic year.
- Meanwhile, the use of conventional learning methods is not effective for improving English learning outcomes in Recount Text material for the 11thgrade students of SMA-IT Al Fikri Semarang in the 2022 academic year.

	1	escriptives			
	Class			Statistic	Std.
					Error
		Mean		63.3969	1.86562
			Lower	59.2400	
		95% Confidence	Bound		
		Interval for Mean	Upper	67.5537	
NGain_Score_Per centage	Experiment		Bound		
		5% Trimmed Mean		63.3229	
		Median		62.8571	
		Variance		38.286	
		Std. Deviation		6.18756	
		Minimum		53.13	
		Maximum		75.00	
		Range		21.88	
		Interquartile Range		7.21	
		Skewness		.095	.661
		Kurtosis		.159	1.279
		Mean		25.8446	4.55283
			Lower	15.7003	
		95% Confidence	Bound		
		Interval for Mean	Upper	35.9890	
	Control		Bound		
		5% Trimmed Mean		25.7281	
		Median		30.0000	
		Variance		228.011	
		Std. Deviation		15.10004	

escriptives

Minimum	6.06	
Maximum	47.73	
Range	41.67	
Interquartile Range	26.69	
Skewness	240	.661
Kurtosis	-1.544	1.279

## 14. N-GAIN SCORE TEST EXPERIMENT CLASS AND CONTROL CLASS DATA WITH SPSS

Basic Concepts of N-Gain Score Test:

1. Normalized gain (N-Gain score) aims to determine the effectiveness of using a method in one group pre test and post test design research and research using experiment and control groups.

2. Gain score is the difference between the post test and pre test scores.

3. In a one group pre test -post test design study (experimental design ), the N gain score test can be used when there is a significant difference between the average pre test and post test scores through the paired sample t test.

4. While in the study using the experiment group and the control group, the N -gain score test can be used when there is a significant difference between the average post test value of the experiment group and the post test value of the control group through the independent sample t-test.

Formulated to Calculated N -Gain Score

### N Gain Score =<u>Post test Score-Pretest Score</u> Ideal Score -Pretest Score

N-Gain Score	Category
G > 0.7	High
0.35850.7	average
G < 0.3	low
Adapted from Melzer (2008) Or	
55 A 27 가 (안영) 다 1957 ( 한영) 가능성 가지 같이 감독하여 (	Category
×	Category Not effective
Percentage (%)	and the second part of the
> Percentage (%) < 40	Not effective

### N-Gain Score Test Case Example

O-For Example, we use the N-gain score test to determine the effectiveness of the use of cooperative learning methods on English learning outcomes in Recount Text material for the 11<sup>th</sup>-grade students of SMA IT AL Fakri Semarang in the academic year 2022. As for the pretest and posttest score data in the experiment class and control class, we can see in the following excel data.

### Stages of N -Gain Score Test with spss

INPUT - ANALYSIS - OUTPUT

- 1. Open the excel word, type the data
- 2. Open the SPSS For Input

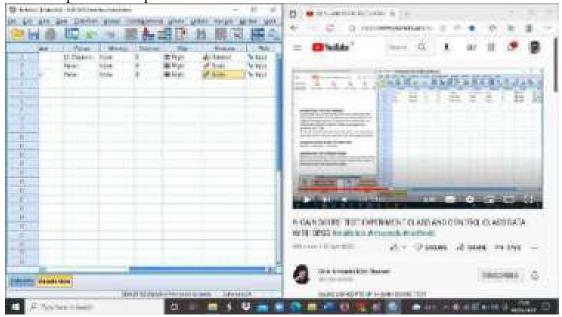
er Cherrigen - B				321		al X F =	5000 1000	хĤ,	21 100011	Within Street		, No	"L	12	8.3	£.
	PE.64			16			8	93		(1)	14	10	10.		14	
Street on Street	-			1000 (144e	ny she	and and the st										
							-									
1																
							-									
(1111)25-111							1			-						-
	-															
	1															
T bengebienettene									24	10	121			_		•
F. Section 1	1	C C	5					£.,	0 💽		-	iii -				

### Input the data pre test and post test from experimental class and control class.

Go to the SPSS fill this type to the variable view.

	Partie State	1 1	Inni Inni Partel	- Later		= O'silds*	Q	K. 40	ш. ст	8
-	Ter-bendlin,	1 1	Webball.		000	In XXX II	1206-1	667	COS LA	
							11月1日1	1.00		
-						All and the second				
						Contraction of the second				
						This is a second	1			
						A Real Property				
_				-	-	in the local division in which the				1
						NOANDURE TELEOR	NACE OCCUPAN	eko o finanko	TATISK OF	
						WTH SEGUEN AND AND	iems tratter			
-						00144010.000	0800.004	tes Shine	er: 19364	-
-		-	_		-	A the second second	11.2			112

### Click on measure column Nominal for group Scale for pre test and post test



Go to excel data and Data view in SPSS Copy and paste all the data In Experiment class

	10.5× 3	1.1				can den	101	 +	1	a., .
Tentin A	The Real Processor		the dates	the last of	pd. Rate	_				
-1	1		-	1 1	10 10					
1	100	1			100					
				10			_			
		1		1 9	100					
ADV. STR	ten:									

	here the second second second	the state of the s							
								2.4	
			and the second		Second St.				
		-		8.0		100	10 E	16.08	1.0
		**							
		-							
	р. — "м. П.	*							
	87		-3						
		The second							
	2								
Management Lengt 2.5 28120 Hors -	Contraction of the local division of the loc		N.						
A Subscription D in M 5 V mark 0 M 4 0 M 4 1 min - all this 2 min			TANKS		2.8-		24-74		+3

Copy and paste all the data from control class

1	2 <b>.</b> 7	ALIC K	12013	1100	_		Q		10	FC 16.	100	14
-	No. of Lot		1	t Distant	An Andreas - Andreas An an Andreas - Andreas							
				1 and	2	K						
					8 8 8 8	-						
				-								
				1								
				1	1	- F						
(MALE)	20,200											
				-								

	1 05 1			-	-9.34			B. R.	and the second	NU CONTRACTOR	10.00
1	a franking		True I and	1	-		the second second	and a state		and shares of the second	
		100	- 19					A CONTRACTOR OF A CONTRACT OF			
			100								
	10	18	1.00								
						_					
		. 61	100				1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				
		- 61 - 14	10				ALL ALL AND ALL ALL ALL ALL ALL ALL ALL ALL ALL AL	-	100		
		- 64	12				A started	and the second			
							and the second sec				
			100								
-		in the second	100								
		1									
-			100								
	100	100	10								
	1.0	44	14								
		100	10.0								
		100									
	T		101								
	- 11	101					And a state of the state of	the second second	1.11		
	- 5-					_		. Conservation	10. C		
		1	1.14								
-		100									
1						-					
-	and the second se	_									



### Go to SPSS Click Transform-Compute Variable

	Proparation Statements	and and								-	-
- The second		_	-	-	_	_	_	_		_	

	The law law law and the Bernstein Law l		2-574 MI
1 5 5 1 Demonstrate			

### Type in target variable column Post\_minus\_ Pre

Strandones Second Se		
B	Luciaren (Local Local Local	

Then Click OK

### That's Already the output

_					_	_									100.00	<u>, 1</u>
	10.000	1.00	Per	And starting from		-	1. 198			10.00	1.14	1.1.1	-			
		- 22						-								
100	- 2	- 20		200 200 200												
Contra -		14		-27.49												-
E .		- 11		10.70 10.70												
1	-	- 23 -	- 21										_			
		- 24	- 60	200 201				-								
	-		- 2										_			
	-			1.4	-	-			_	-			_	-	_	
		14	- 2										_			
			- 2-	10.00												
	- 27	- 22		2018 2020 2021												
			1	638									_			
		- 11		2.22		-			_				_	-	_	-
-	1	1											_			
		100	- 14	1.00				1								
-		1.0	14													
			- 8	1.72												
E.	- 20	- 20	1	1.0	-			-					_			
	1		100	1.11				-				_	_			-
	100	1		1.14												
4.		- 21	- 1	8.35									_			
			-													
			_	_		_	_		-		_	-	-	_	-	-

Click transform again and then compute Variable

	Brownsky Targerson	Participa -	Contra Manageria		0.90.79			-		
1. 1.	and the second	1.00			1.14	1 44 C 1 44		-	-	ľ
	Illine on the party in the	10								
	The part of the strength	8		-						
	International	1		-			_			t
	COMPANY AND ADDRESS.	18 mm								
	Difference descents.	1.								
	an operation of the second	20					_			
( )	Paulduko kanto 1	10 mm			_	_	_	_		E
	204 oktores	S		_			_			
	Billion and the states of the	10 m		_						
	and the state of t	10 million -								
	All restaurants and a second	1	_					_		
1	Santa a de sint gin heter.	3		-						
	A Contract of the Association of	100								
	0 0 1	44					_			
	14 M	103								
	- A - 4									
		1.00								
		-								
		_					-			

	144	14	Section in the	Angelanen	1	Table 1 pt 1000
	I share a subject to save a feature of		And and a	(a)		
11 11 12 12	ų.	8.3.0	B	Land and Land Land		

Type Onehundred\_minus\_pre

	•		-	

d.			1.2.4			1	1						(and and	16
11	10.00	14	1.000	Barlinson Sta	Bart 4840 (1944) (19	-	-	-	1			-	and the second second	
		100		10.00	10.07				1000					
			- N.		2.6									
		- 12	1.0	2531	100									
		14		10.00	. 41.41									
	1.0		1	0.14	10									
	1.1		- W	20.22	4-74 									
		- 14	100	24.0	- 30 80									
			14	31.0	100									
		1.00		1.14	- 10 M									
		14			2.8.8									
		100.	- 10	300										
			-	A.H.,	- R									
		- 19		10.0	1.0									
	- 2			2.22										
-	187	- 6		1.44	- 2									
			190 190	11										
				1.0										
	- 20	- 2	- N.		28									
				1.0										
	1	10	- 18	14										
				- 14 - 14	100									
-				m.33										
1	-	_		-		_	_			_	_	_	_	-
		_					_			-			_	

That is already the output OneHundred\_minus\_Pre

Next, type N-Gain \_score

「「「「「「「「」」」」」「「「「」」」」」」」	* Searce in

That is already the output of N-gain Score.

-	- Anna	1.10	and the second s	Hair man for	Constrangened on long Page	Survey, Name
1.1. 1	11	10.	1998	100.000	.19-08	
	1	84 00	34	20.00	IDG-001	10
2	S	0.0	12	20100	42:00	10
*	10.0	101		201-001	40139	1
		343		10,000	107.000	
i –		61.	82	20.22	IN CAL	
100 million (100 million)		6.6	1944	14.00	DG-GB	
0		40	146	20.00	127.00	
10.		101	176	10.001	72,136	
1		1.4	40 47 41 79	22.59	36.00	1
01. E	10	100	40	- 100 Later	10.00	
14		14	000	0.08	- Art 1.90	
18.	1	11	292	.0.00	100 CB4	
14		187	100	20 JUL	44.000	
			75 111 141	12.299	255 (FB)	1
18		199	1998	2.20	102.136	
191		108	100	17.08	42.10	34
18.	3	-00	. 12	3,39.		
18	25	70	- 14	- QLQM	100.00	
201	1	307		200	-20106	
24	- N	101	0.436	105,001	-40100	
22			2.8	26.165	82.06	
	1.000				54-69-1	
	sectores.					

ten fret fan ditter trirring	Brugaliana.			(and the	1.00
	Annual Construction of the				
	B	Land Land, Case, Devol Lines			

That is already the output N-Gain score of percentage

			EA			300				inter a	100
11.04		-	Sec. 1	The start of	Bartana (Marcha)	History Street 1	The second second second	-		1.00	
		-		100	- 10.00	- 100	18 C)				
-		1.10		2.0	2.6	100	10.00				
	-6-	12	100	25.28	12.10	- 54	10 m				
		100		10.01		2	174.68				
		100	10	10.14	3.0	100	20				
	100	10	1.10	19.22	40.00		10.0				
		14	1.00	24.00	8/N. 31 N.	100	10.01				
	- 10	- 60	14	20.0	100		12.10				
-		1.00		1.11	10.0	270	TT 11				
		14	***	22.08	2.8	- Ar - B	81 - 12 M 13 M				
			1.00	204			42.08				
		- 10	- 10			8	- 0194				
		142	75	6.0	10.4	10	1.000				
		144		2.22	5.8		10 T T				
	18	1.10	- 10	171	100		-11.0				
		146	- 14	199	.04						
	1	1.01		10		1.00	8.4				
		. A.,	11		218		.10				
	1	14	15	1.0	4.4	1.00	- 10 MC				
	-41	15	- 18	- 121	2.8	-10	38				1
	- X			10.00	- 0	- 2	18.84				
	1.00	- 140	18.	8.33							
-		1.1						_	_	_	
		_							_		

2 P	Edmine (			100 . 10		00-40+	<b>股目</b> []
			Paris Mexico and Area way		-		
1		in the second second	max         annual           0         1<		(m) (norm) (norm) (norm)		
			Department				
54	and the Property lies of	Second and	And "Well-Statement" Los State The Statement	$\left( \right)$	Topological Sector		
a sine			TN Sales allows Notes	10.00			
			Trankar Trankar Jackar	31136 - 970 - 100			
			Accellance Accellance Towner Terms				
		S.A.See	Ann Martinessen Baseling Martinessen Baseling	11184 71785 21366	110.00		
			A another the second se	261361	-		

Image         Image         Image           International Control C		Notaeronau Yolaeronau Toeraet	- 14	91.		1000	
6.00 E. 1918	Name and Coal Plats Marchen Josepher Frank Marchen Josepher Marchen Josepher Mar	in fame Tryst Ave					

#### N-Gain Score Test Interpretation

Referring to the N -Gain value the form of of percent(%) and the descriptive output table, we can make a table of the results of the N-gain score test calculation below: Get the N-Gain result from SPSS

N	-Gain Score Te	est Calculation	on Results
No.	Experiment	No.	Control Class
	Class		
	N-Gain		N-Gain Score(%)
	Score (%)		
1	65.71	1	31.03
2	55.56	2	30.00
3	69.05	3	47.73
4	75.00	4	36.36
5	59.46	5	6.25
6	66.67	6	41.46
7	66.67	7	9.68
8	62.16	8	10.00
9	53.13	9	6.06
10	61.11	10	30.00
11	62.86	11	35.71
Mean	63,39669	Mean	25.8446
Minimum	53,13	Minimum	6.06
Maximum	75,00	Median	47.73

### Conclusion

1.Based on the results of the calculation pf the N-gain score test, it shows that the average value of the N-Gain score for the experiment class (cooperative learning method) is 63,3969 or 63.3 % is categorized as effective enough .With a minimum N-Gain score of 53.13 % and a maximum of 75 %.

2.Meanwhile ,the average N-gain score for the control class(conventional learning method ) is 25.8446 or 25.8% is included in the ineffective category ,with a minimum N-gain score of 6,06 % and a maximum of 47,73 %.

 So.it can concluded that the use of cooperative learning method is effective enough in improving English learning students in Recount Text material for the 11<sup>th</sup> grade students of SMA IT Al Fikri Semarang in the 2022 academic year.
 Meanwhile ,the use of conventional learning method is not effective for improving English learning outcomes in Recount Text material for the 11<sup>th</sup> grade students of SMA IT Al Fikri Semarang in the 2022 academic year.

## 15. INDEPENDENT SAMPLE T TEST FOR N-GAIN SCORE WITH SPSS

### BASIC CONCEPTS OF INDEPENDENT SAMPLE T TEST

1. Independent Sample t test is part of the parametric statistical analysis used to test whether there is a difference in the mean scores of two groups of unpaired data.

The type of data used in this test is in the form of interval or ratio scale data.
 The requirements for using this test are data with normal distribution and homogeneous variance (not absolute requirements)

4. If one or both of the data are not normally distributed, then test the hypothesis using a non-parametric statistical test with the Mann-Whitney u test (Everitt & Skrondal, 2006; Field, 2005; Garth, 2008; Oliver-Rodríguez & Wang, 2015; Wilmot & Mansell, 2014).

# EXAMPLE OF INDEPENDENT SAMPLE T TEST CASE FOR N-GAIN SCORE

- ✤ After previously knowing the effectiveness of the use of cooperative learning methods (experimental group) and conventional learning methods (control group) on English student learning outcomes, through the interpretation of the average value of the N-gain score (%).
- Next, we will compare whether there is a (significant) difference regarding the effectiveness of using cooperative learning methods with conventional learning methods in improving English learning outcomes in Recount Text material for the 11th-grade students of SMA-IT Al Fikri Semarang in the academic year 2022 using independent sample t-test techniques for N-gain score (%).

# INDEPENDENT SAMPLE T TEST STAGES FOR N-GAIN SCORE

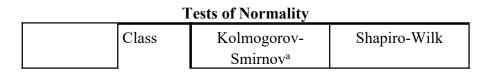
Open the SPSS file entitled "N-Gain Score.sav" which you have earlier. Next, we can go further to this video ANALYSIS (normality test, homogeneity test, and Independent sample t test OUTPUT.

### BASIC DECISION OF THE SHAPIRO WILK NORMALITY TEST

1. If the value of Sig. > 0.05 then the data is normally distributed.

2. If the value of Sig. <0.05 then the data is not normally distributed.

**Note:** the Shapiro Wilk normality test was chosen, because the number of samples (N) used for both classes was less than 50 participants. Meanwhile, if the sample that we use in the study is more than 50, the normality test is carried out with reference to the Sig value. Kolmogorov Smirnov test.



		Statist	df	Sig.	Statisti	df	Sig.
		ic			с		
NGain_Scor	Experime nt	.117	11	.200*	.983	11	<mark>.979</mark>
e_Percentage	Control	.245	11	.064	.880	11	<mark>.104</mark>

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

# INTERPRETATION OF INDEPENDENT SAMPLE T TEST FOR N-GAIN SCORE WITH SPSS

### First output table "Group Statistics"

Before we interpret the meaning of the output table, we first need to look at the categorization of the interpretation of the effectiveness of the N-Gain (%). Such as the following.

Percentage (%)	Category
< 40	Not effective
40 - 55	Less effective
56 - 75	Effective enough
> 76	Effective

- Based on the Group Statistics output table, it is known that the Mean NGain\_Persentage score for the Experimental Class is 63.3969 or 63.4%. Based on the category table for the interpretation of the effectiveness of the N-Gain score (%), it can be concluded that the use of cooperative learning methods (in the experimental class) is effective enough in improving student learning outcomes.
- Furthermore, it is known that the Mean NGain\_Pesentage score for the Control Class is 25.8446 or 25.8%. So based on the category table for the interpretation of the effectiveness of the N-Gain score(%), it can be concluded that the use of conventional learning methods (in the control class) is not effective in improving student learning outcomes.

	Class	Ν	Mean	Std.	Std.
				Deviatio	Error
				n	Mean
	Experime	11	<mark>63.396</mark>	6.18756	1.86562
NGain_Score	nt		<mark>9</mark>		
_Percentage	Control	11	<mark>25.844</mark>	15.1000	4.55283
	Control		6	4	

Group	Statistics
-------	------------

So statistically descriptive, it can be said that there are differences in the effectiveness of implementing cooperative learning methods with conventional learning methods in improving student learning outcomes.

Next, to find out whether the difference in the effectiveness of the two methods is significant or not, the method is to interpret the second output table "Independent Sample t Test".

- Based on the output table, it is known the value of Sig. on Levene's Test for Equality of Variances is 0.002 < 0.05, it can be concluded that the variance of the N-Gain Score (%) for the experimental class and control class data is not homogeneous. Thus, the independent sample t-test for the n-gain score is guided by the value of Sig. contained in the table Equal variances not assumed.</p>
- Based on the "Independent Samples t Test" output table, it is known that the value of Sig. (2-tailed) is 0.000 < 0.05, thus it can be concluded that there is a significant difference in effectiveness between the use of cooperative learning methods and conventional learning methods to improve English learning outcomes in Recount Text material for the 11th-grade students of SMA-IT Al Fikri Semarang in the academic year 2022.

		Leven Test f Equalit Varian	for y of		t-te	est for	Equalit	y of Me	eans	
		F	Sig.	t	df	Sig. (2- taile d)	Mea n Diffe rence	Std. Error Diffe rence	Confi Inter	5% dence val of ne
									Diffe Low er	rence Uppe r
NGai	Equal variances assumed	13.272	.002	7.632	20	.000	37.55 223	4.920 25	27.28 878	47.81 569
	Equal variances not assumed			7.632	13. 26 6	<mark>.000</mark>	37.55 223	4.920 25	26.94 432	48.16 014

**Independent Samples Test** 

### **SPSS TUTORIAL & PRACTICE**

# INDEPENDENT SAMPLE T TEST FOR N-GAIN SCORE WITH SPSS: Normality Test, Homogeneity Test

Before The Interpretation meaning of the output table,

first need of the effectiveness of the N Gain (%). Such as the following :

N-Gain Score	Category
G > 0.7	High
0.3≤g≤0.7	average
G < 0.3	low
dapted from Melzer (2008) Ir	/
동 승규가 여전에 다 여름이 잘 하는 것을 걸었다. 감독 아이는 것을 잡았다.	Category
•	Category Not effective
v. Percentage (%)	
Percentage (%) < 40	Not effective

The Basic Concept of Independent Sample T Test :

1. Independent Sample t test is part of the parametric statistical analysis used to test whether there is a difference in the mean scores of two groups of unpaired data.

2. The Type of data used in this test is in the form of interval or ratio scale data.

3. The Requirements for using this test are data with normal distribution and homogeneous variance (not absolute requirements).

4. If one or both of the data are not Normally distributed, then test the hypothesis using non-parametric statistical test with the Mann-Whitney u test.

Example of Independent sample t test case for n gain score

 After previously knowing the effectiveness of the use of cooperative learning methods.(experimental group) and conventional learning methods(control group) on English student learning outcomes ,through the interpretation of the average value of the N -gain score (%). Next, we will compare whether there is a (significant)difference regarding the effectiveness of using cooperative learning methods with conventional learning methods in improving English outcomes in Recount Text material for the 11 th grade students of SMA IT Al Fikri Semarang in the academic year 2022 using Independent sample t test technique for N -Gain score(%).

### Independent sample t test stages for N-Gain score

Open the SPSS file entitled'' N -gain score.sav'' which you have earlier . Next ,we can go further to this video analysis (normality test, homogeneity test, and independent sample t test OUTPUT).

Basic Decision of the Shapiro Wilk Normality Test

- 1. If the value of Sig.>0.05 then, the data is normally distributed.
- 2. If the value of Sig.<0.05 then the data is not normally distributed.

Note :The <u>Saphiro Wilk</u> Normality test was chosen, because the number of samples (N) used for both classes was less than 50 participants. Meanwhile , if the sample that we use in the study is more than 50, the normality test is carried out with reference to the Sig.Value.Kolmogorov Smirnov test.

We take the data from N gain score, From the previous meeting.

10.00	AL	10			<b>美國國語</b>	9 64 6	L.L.C.BR.		
			CONTRACTOR OF						index of
	Server 1	199	124	Hart mana Par	History and the second	Were linger	There is a free the state of the second	1.00	and the second second
	10.00-00		Constant Property in	- ALL PROPERTY OF			CONTRACTOR OF THE PARTY OF		
	1	. 14	11		.3631	1.44	46.56		
	1.1	14	100	3408	-44.00				
	1	18	196 -	10.00	40	20	10.00		
	- C	110	10 M M	2008.(	(#10)		101.00		
	7.		10	26(8)	35.00	47	64.67		
		14	10 65	3458	28 DV	0 0	State .		
			60.	1101	07.00		0.30		
	1	10	- 14	31001	14.00	- A4E	16.3		
	1	- 14 C	- 6	1100	3.00	.01			
		- 64	- KD	15(6)	H-02	- 65	444		
	10 A	2	65	4.18	18.00	51 51 14	2.90		
	1	1.1	- 18.	3.81	10.532		1233		
				1.14	.11.00	1	0.05		
	1	. 6-	(W)	114	10.00	36	3.35		
		- 14	14	(104)	01.00	- 10	4.14		
		- 18	181	1000	#10		× 40		
	<i>F</i> .		- W.	6.6	JII 40	16°,	7948		
	15	1	55	10.0	-1610	45	10.00		
	1	- 1	- 47		.008	100	1.86		
			- 20.	1100	0.03		1991		
-	- E.	- 14	34	16.04	-010	34	(B.)		
_									
	- H.								

### Check the Normality test

	And with a statement of the	The Statement	-	1400.0			a lat
University in the	Colorer Terrin .		1. Sec. 1. 1. 1.	Sive Street	These lives Property	100 I III	1005
1 1 1		the second s			- I THE AVERAGE AND A STREET OF A		
		Wittens.	10110	7.865	46.56		
1 1	8,000.000 T	BURN RESIDEN	44.00	- 68			
12 1 年	(rem a	Eg-	-10.00	200	75.002		
1 1	England a	Bip-res.	1710		101.00		
1 1	1 A	Bi gianne	10.00	67	64.87		
1	Address of the second s	A REAL PROPERTY AND	28,000	100	and a		
1 3	STREET.		07.00		10 M		
1 1			141.002	60	46.3		
1 1	Enclosed averaging a		10.00	.01.	4.4		
1	Haraun tem -		16.00	121	414		
1 A A	gerandene fam		19.00	71	1.99		
2			10.00	1	£33		
			11100	2	10.75K		
E 6			10440		3.16		
E 0.0	The Wood of Case Projects.		0100	145	4.74		
	Bully's challenge *			44	4 M		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Consecution 1		10.00	10.1	1948		
F 4	T testadore.		-1610	4	10.00		
2	gartenini -		3000	185	1.86		
	Etaling.		#10		1999		
	And the second s		1010	141	18.74		

員員	E con			躍らる		a.		
		menor co.			all successive de			man 141
- Terren	1.00	First State	post for an instants	rank of the		from Property and a second	1.00	and the local
- CULUE	No. of Concession, Name		Contraction of the second s	CONTRACTOR OF A	100 A			
	1	111	1008	.3630	. MC.	44.96		
_	11.000	611	0.25	4110				
	1 M	496.	- Bitger		$\vee$	here we have a second s		
	44			Low make		91/6		
	7	10 C	A martine	And Address of the Ad	and share to be stated by	61.12		
	十二条		- A newstree			94.65		
			2 Pringettint	and the second second	10000	00.00		
	1	H.	A fee plan fe	DATE AND	manufacture in the second second	4.3		
	1. 195	- M1-	d man she	1.00			_	
	1. 日報日	10				48		
	1 1	14			TY	3.40		
	2	10		The second		32.83		
	a	*	That is a second s			17.73		
	1	(4	alge Otgene	CTPpss.		3.35		
	10.04	14			the second s	4.15		
	E	181	U. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	Literal street liter	01 - CT	a		
	F	14 ·				1.000		
_	F 14	55	2.2	-10.00	W	10.003		
_	2	44	318	38.00	14	18		
	5	務	104	2010	10	101		
-	A	36	9.01	-10109	- M	(m.))		
								_

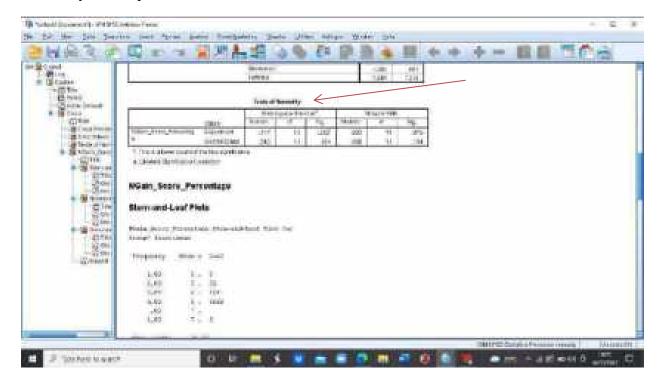
Move the N-Gain score percentage to the right side in DEPENDENT LIST BOX.

Move the class (Group) to the right side on the FACTOR LIST BOX.

Arrow         No.         Part Hold Provide State         No.         No.         No.           1         0	
T III YA STRATE	
permittan permittan	
1 E E Carter and Provide all	
H H 2 Prosting Statement Ask and	
1 1 15 2 4 Per Alexa 24 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
A RE CONSTRAINTS AND	
1 2 2 2 E	
2 75 78 28 2.00	
2 4 7 E mus 27	
2 0 14 Alge Organs Cityst XX	
E 16 16 41	
The second	
2 4 47 228 200 26 16	
2 4 M 22 20 M 28 20 20 20 20 20 20 20 20 20 20 20 20 20	
ે છે છે પ્રસં લો છે છે. છે	

Click plots- click normality test -then click OK

### Normality test output



Because the Data is Normally, so that we can go to the Independent sample t test.

	taget V	STATISTICS.		100	and the second second	-	-	instant Part A
The last	The Congrade States	The pass		Week Witter	The live Provident and			and an other states of
	The State Make	* Blows			- Chief and the second second			
	<ul> <li>Personal and a second se</li></ul>	Contraction of the second s	man design Thes.	10 M	404	-		
	angelineane		Bandres Three 1		416	_		
18	SH (Deeting	and the second second second		- 20	11.00			
	The Propheters	a Hiper			10.00			
7.1	The Autom		10.03	17	64.87			
	Harri Manne	1.4	28,007	10° 53	(14) (12)			
- A.			-0700		00.00			
			14.00	641	4.3			
1	Aler Bernerite from Street		31.00	.01	#=11			
1.	Briegen his		IE 02	100	65.65			
2	and the second second second	1	19(00)	71	1.10			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A shore and		10.532		\$2.85			
	the state		44.00	2	27.73	G		
	Baben ferfannen	19	1010	- A.	3.3			
	in the Wall of Star Project.		0110	10	4.15			
	The states and states	12		- H	6.45			
F	an Constantinister	1.0	III 10	100 C	1148			
	A Constantinue		-1610	45	11.85			
	W garbitumi		.0100	10	1.85			
	······································		0100		11.04			
		-	-010	141	1.0			

# Go to analyze- Compare Means-Independent Sample T Test

Move to N gain score percentage to the right box on TEST VARIABLE(S) BOX.

						/			many with
10	Sec. 1	See. 1	Fred Plants	rank for	d maralle and the second	Ever Brenn Press &	or Production	1.1	and states
				114					
		1.00	10	1004			46.56		
	1	- 10	10	360	4100	1	4.45		
_	-			part and their second reasons are			12.005		
	10	18	225	- Congenitations	and the second		10.00		
	-		194 10		a francisco de la constante de		10.17		
	2.5	1.00	10	a fan jitte de fan	- Portform		98.67		
	1	14	10 60	distant files	Ch. Lipson	All And And All And And All An	wet		
		1	ex	Status Feet		and the second sec	C 10		
		10	14	differents. to			44.9	_	
	- T.	÷.	15	d traded as in					
	1.		- W.	P 800.3.00			43.96		
	1 A.	2	65	10000000000000000000000000000000000000	Course and the second s	AND CONTRACTOR OF	2.90		
	2.				a source a se		32.83		
			10				17.75		
	1.1	- Q-	(W)				31.76		
	1	14	10		The second state	AND COMPANY OF THE OWNER	4.76		
			18	HOC.	witt)		6.4		
	1		100	10.0	10.00	82	10.00		
	100		25	518	70.00	45	1000		
			8.8	108	.0100	10	1.00		
		- 2-	- 22		#10		1101		
-		- 10	16	N/AT	-010	1	18.71		
-			100	- TRUE .	. 36.00		10.11		
_									
	L	_							_

Then, move control group TO RIGHT SIDE ON GROUPING VARIABLE

								instead of the
- Seven	1					in the state of the second	1.00	and Station
0.00	1.000		and a second	Line - All and a second	the state of the s	10.10		
	1	10	10.0	.00181 +1.001	/			
		011	3808					
			- Statements	and the second sec	/*	1999		
_				a torrest of the		NY /6 (4) 17		
	1	10	J Delas Bel	A SUGAR		and a		
	1一番	100	of the second second	a transferre		00.00		
			de batt setting for	1 H		40.5		
		- H-	# 6%500-01,168	2 I.T.		-		
		10	d Meet, Sten			616		
		45				3 40		
		13		Cash true hitrate	V	2.83		
-				Second St.	<u> </u>	275		
		- W		A CONTRACTOR OF A CONTRACT		1.1		
	1.1	10		- Internal Colors		10		
		14	1100	er 10				_
			0.0	100 M	1	100		
		35	118	7000		198		
-		8.0			121			
	- 1 -				10	1.01		
	5	10	16281	- CIII		10.11		
			- TELAL	. 1610	-	- 18 ct -		

n Ips				,click	,	/	d
-					_ /		-
	10 Jacobs 10	100 million 100 million			12:00 0	6. C	
The second se		AND IN THE					inter in
2000	1. A.M.A.	and the second second		10000-3000	desident - Dub	alon, Prostat	
	1 11	10.	16.0	.00181		56.54 (81.96)	
	1. 1.	198. 196	- Congenition	and the st	. / .	75.99	
	7	10	and the second se	Institution of	Contract	61.07	
	1 准	100 100	# South Pol	A REALING	and the second second	00 PT	
	1. 18	14	di Fati staja Pa			41.5	
	1 1	85 67	d Ner birn			6.0	
	1 1	45. 18		Course the		5.85	
	E	12		Colorest and a	17 2	\$280 (2775	
	E	59 14	1	The second second second	and the second se	2.5	
	E	181	TRACE.	- 00	1	6.46	
	5	14	100	20.40 Th (D)	- K.	1948	
	2	1.0	218	.0100	10	1.00	
-				100.000	100		
	1 0 H	H H	10 10 10 10 1		* •		nami Anamis Santasa Buli
3 Yashe		in and and a second sec	10	cu	*	<b>8</b> .9	
) (anter ) (中) (1)		2 2 21 21 21 21			* • • • •		- 4 8 8 8 4 0 ann
3 Yashe					* 		* 18 84 8 10 10
) (anter ) (中) ()		2013 1917 1917 1916 1916 1917 1917 1917					- 4 8 8 8 4 0 ann
) (anter ) (中) ()					* 	B-1 Second Second Second Second Second Second Second Second Second Second Second Second Secon	- 4 8 8 8 4 0 ann
) (anter ) (中) ()						B-1 Decision form	
) (anter ) (中) ()						B-1 Decision forms I I I I I I I I I I I I I I I I I I I	
) (anter ) (中) ()						B-1 Decision form	
) (anter ) (中) ()						B-1 Dec (1) ment former B-1 B-1 B-1 B-1 B-1 B-1 B-1 B-1	
) (anter ) (中) ()						B-1 project means from and and and and and and and and	
) (anter ) (中) ()						B-1 Dec (1) ment former B-1 B-1 B-1 B-1 B-1 B-1 B-1 B-1	
) (anter ) (中) ()						B-1 project means from and and and and and and and and	
) (anter ) (中) ()						Bit Sectored and Sectored and S	
) (anter ) (中) ()						B-1 Decident Control Decident Control Decident Control Decident Control Decident Control De	
) (anter ) (中) ()						Bit Sectores to sectores and a secto	
) (anter ) (中) ()						B-1 project means from and and and and and and and and	

Type on the dialog box define group

For group 1 is experiment class

For group 2 is for control class

Then , click continue and click OK

There are two the outputs

1. Group Statistics

### 2. Independent Sample Test

				Chief								
ey 1. jurisse Tam Count Provide	Antonio antonio antonio Antonio antonio antonio Antonio antonio antonio antonio Antonio antonio antonio antonio antonio Antonio antonio antonio antonio antonio Antonio antonio antonio antonio antonio antonio antonio Antonio antonio antonio antonio antonio antonio antonio Antonio antonio antonio Antonio antonio antonio antonio antonio antonio antonio antonio antoni		94.)	/								
The State of State	T-Torit											
Cine.			er bielles					/				
200		tine .	16	10.00	Course	in a						
	100400_0000_0002780 6	Conversed.	2	41,2245 31,2446	103211. 103200	Alternation of the second						
15		Conten			nin Antonio Sec		k					
						NUMBER OF STREET	100.000		_	_		
	r			Carrier for	der faste der				and the second second	A STATE OF		
and the owner water w					ana facilitati "				No.	Buller	W% (200364) 2007	100
1	Margaretterrang	End attack		-	-	1			1111		45 (2008) 2007 2007	inician ini inician inician

N-Gain Score	Category
G > 0.7	High
0.35850.7	average
G < 0.3	low
dapted from Melzer (2008) r	/
김 아랫동안에 여러 가슴에 들고 가장에 가는 것이 집에 가지?	Category
e	Category Not effective
r Percentage (%)	and the second se
r Percentage (%) < 40	Not effective

- Based on the Group Statistic output table, it is known that the Mean NGain .percentage score for the Experimental Class is 63.3969 or 63.4%.Based on the category table for the interpretation of the effectiveness of the N Gain score (%).It can be concluded that use of cooperative learning methods (in the experimental class) is effective enough in Improving student learning outcomes.
- Furthermore, it is known that the Mean NGain , percentage score for the Control Class is 25.8446 or 25.8%. So based on the category table for the interpretation of the effectiveness of the NGain score (%), it can be concluded that the use of conventional learning methods (in the control class ) is not effective in Improving student learning outcomes.
- So ,Statistically descriptive, it can be said that there are difference in the effectiveness of implementing cooperative learning methods in Improving student learning outcomes.

### Second Output

	10 A	副州書		-	and the second second							
		())) & Le (1847)	-9-									
CONTRACTOR OF THE OWNER			-	-		Real Property in						
		1000	140.1	Black 11	Ex Duates	Margaret						
	anter percetas	Constitute Constitute	*	10.00 ( 10.000)	Ex Dominio Ex 2016 PC 2016	Alter of a						
	n de recaleg	Courses.	14	H286	6300 90300	A state	in la					
	and the second	Courses.	14	H Martin Martin	53214 903937	1.88.127	-			1000		
	aran) yeriarkaş	Courses.	14	H Martin Martin	10,000	A state			10010-2020		3504360	000-110
	n mi yesirilag	Courses.	14	H Martin Martin	53214 903937	A state		ng Louise	Hart Start	el Borne Baction Theories	We Contraction Table	Norst and Acc.
	colocate colocate	Courses.		Creat Time		A state			Main	Beller.	2084	898

#### Independent sample t test output interpretation:

Next, to find out the difference in the effectiveness of the two methods is significant or not, the method is to interpret the second output table."Independent Sample T Test"

- ✓ Based on the output table, it is known the value of sig.on Levene's Test for Equality of Variances is 0.002<0.05 it can be concluded that the variance of the NGain Score (%) for the experimental class and control class data is not homogeneous .Thus, the independent sample t test for then n gain score is guided by value of sig. Contained in the table Equal Variance not assumed.</p>
- ✓ Based on the ''Independent Sample T Test'' output table , it is known that the value of sig.(2-tailed )is 0.000<0.05 ,thus it can be concluded that there is a significant difference in effectiveness between the use of cooperative learning methods and conventional learning methods to improve English Learning outcomes in Recount Text Material for the 11 th grade students of SMA IT AL Fikri Semarang in the academic year 2022.</p>

		지세추		. here	En ar	Court In	-				30	add.
and the second	and and a	114 (41)447					/	,				
24		( and		the second s	la Domini							
-lasi		Constraint, Constraintiger		10,2040 10,2040	6306 6300	1.000	$\checkmark$					
Herrich					and the second se	and the state	and have					
1					atta ( parta al. "				No. of Concession	d Bolinia		
1			1						Antes	Buller	NR (21728-1) 228-1	100
	Sec. 1	Cold artisteet	-	1420	146	1.00		100	1743454 - 191023	COMPANY.	2712410	THE OF IS
Tites, howy,		enterent. Reconstructioners	11	191.0				0.02			1.000	
1044,0040						1.11	100000	1000	- 10- Pol (10-	The Statement	· REPORT	10,1000

If the data is not homogeneous, chose the Equal variance not assumed.

## **16. BAR CHART AND FREQUENCY DISTRIBUTION TABLE OF N-GAIN SCORE with SPSS**

### **BASIC CONCEPTS**

1. Descriptive statistical analysis is useful for presenting data in summary form to make it easier for readers to understand.

2. Bar charts and frequency distribution tables are part of the descriptive statistical analysis.

3. Bar charts are useful for showing numbers expressed in the form of rectangular figures.

4. The frequency distribution table is an arrangement of data based on certain categories presented in the form of a summary list (Everitt & Skrondal, 2006; Field, 2005; Garth, 2008; Singh, Kumar, 2006; Vanlalhriati & Singh, 2015; Wagner, 2015).

### SAMPLE CASE

- In the previous video tutorial, we have calculated the N-gain score for the experimental class and control class with SPSS.
- The summary of the results of the calculation of the N-gain score can be seen in the following excel data:
- Note: the experimental class is used to measure the effectiveness of the use of cooperative learning methods, while the control class is used to measure the effectiveness of using conventional learning methods on English learning outcomes in Recount Text material for the 11th-grade students of SMA-IT Al Fikri Semarang in the academic year 2022.
- For the case example in this video, we will practice how to create a bar chart and frequency distribution table from the N-gain score for the experimental class and control class.

### STAGES OF ANALYSIS WITH SPSS

The first step, we need to look again at the formula for the category of interpretation of the effectiveness of the N-gain score below.

Percentage (%)	Category
< 40	Not effective
40 - 55	Less effective
56 - 75	Effective enough
> 76	Effective

Adapted from Hake, R.R (1999)

The next step is to group the N-gain score acquisition data for each student (in this case there are 11 students) based on the category formula for the interpretation of the effectiveness of the N-gain score above. This data grouping value will be used later in the descriptive analysis process with SPSS.

- For students who get an N-gain score <40% then a grouping code of 1 is made, a N-gain score of 40-55% is made a grouping code of 2, a N-gain score of 56-75% is made a grouping code of 3 and a N-gain value is made score >76% made grouping code 4.
- The value of the grouping of N-gain scores for the experimental class can be seen in the excel data on the right
- ✤ INPUT --> ANALYSIS --> SPSS OUTPUT

### **INTERPRETATION OF SPSS OUTPUT TABLE "FREQUENCIES"**

Based on the output of "Statistics", it is known that the valid N value is 11, meaning that the number of respondents entered into the SPSS is 11 students.

-		Statistics	
		Experiment	Control
		Class	Class
NT	Valid	11	11
N	Missing	0	0

Then in the "Experimental Class" output for the Frequency and Percent sections, it is known that there are 1 or 9.1% students who get a gain score of <40%. Furthermore, there are 10 or 90.9% of students who get a gain score of of 56-75%.</p>

_	L	xperimen	it Class		
		Frequen cy	Percen t	Valid Percent	Cumulativ e Percent
Vali	40-55% (Less Effective)	1	9.1	9.1	9.1
d	56-75% (Effective Enough)	10	90.9	90.9	100.0
	Total	11	100.0	100.0	

### **Experiment Class**

✤ On the other hand, in the "Control Class" output for the Frequency and Percent sections, it is known that there are 9 or 81.8% students who get a gain score of <40%. Furthermore, there are 2 or 918.2% of students who get a gain score of of 40-55%.

		Frequen cy	Percen t	Valid Percent	Cumulativ e Percent
	<40% (Not Effective)	9	81.8	81.8	81.8
Vali d	40%-55% (Less Effective)	2	18.2	18.2	100.0
	Total	11	100.0	100.0	

**Control Class** 

### **BAR CHART OUTPUT FIGURE**

The output image shows the frequency distribution of the gain score in the form of a bar chart (its interpretation is as contained in the frequency distribution table).

## TUTORIAL & PRACTICE BAR CHART AND FREQUENCY DISTRIBUTION TABLE OF N-GAIN SCORE WITH SPSS

### **BASIC CONCEPTS**

1. Descriptive statistical analysis is useful for presenting data in summary form to make it easier for readers to understand.

2. Bar Charts and frequency distribution tables are part of the descriptive statistical analysis.

3. Bar Charts are useful for showing numbers expressed in the form of rectangular figures.

4. The frequency distribution table is an arrangement of data based on certain categories presented in the form of a summary list.

### Sample Case

- In the previous video tutorial ,we have calculated the N-Gain for the experimental class and control class with SPSS.
- The Summary of the results of the calculation of the N-gain score can be seen in the following excel data :
- Note :the experimental class is used to measure the effectiveness of the use of cooperative learning methods, while the control class is used to measure the effectiveness of using conventional learning methods on English Learning outcomes in Recount text material for the 11<sup>th</sup> grade students of SMA IT Al Fikri Semarang in the Academic year 2022.
- For the case example in this video ,we will practice how to create a bar chart and frequency distribution table form the N-Gain score for the experimental class and control class.

### STAGES OF ANALYSIS WITH SPSS

■ The first step ,we need to look again at the formula for the category of interpretation of the effectiveness of the N-gain Score below.

Percentage (%)	Category				
< 40 ]	Not effective				
40 - 55	Less effective				
56 - 75	Effective enough				
> 76	Effective				

Adapted from Hake, R.R (1999)

- The next step is to group the N-gain score acquisition data for each student (in this case there 11 students) based on the category formula for the interpretation of the effectiveness of the N-gain score above. This data grouping value will be used later in the descriptive analysis process with SPSS.
- For students who get an N-gain score <40% then a grouping code of 1 is made ,a N-gain score of 40-55% is made a grouping code of 2, a N-gain score of 56-75% is made a grouping code of 3 and a N-gain value is made score > 76% made grouping code 4.
- The value of the grouping of N-gain scores for the experimental class can be seen in the excel data on the below:

	No Charles Transmitters C. C.	sloriuteen	endis	743	fain Sant Test Dilindo	illen Nevalis	1.0	n Scott This Calescott	anficiality
10.	N-Garr Inne (K)	- Nia	N Gain Store (%)	NO.	Experience Cont.	Sinong	80-	Contractions Notation Science (Not	
14	EAST COMPANY		and the second se	- 3	45.71			1	
1	122.54	1	100	53	35.54	1.1		2 88,985	
10	68.49	3	68,23	1	85.25	1.1		1 17.75	3
1	1.		100	1.4	85.08	14.1		4 200,000	
	Column 1	3	1.00	1	5548			5 4961	
	1000		4.44	1.	8.0.157			• #5386	
2	16.20		1.1.0	3	54.67	(a)		1 (A 200)	
	6738		10.00	11	\$720	100		E shame	
	33.00				5111	1.2		1 100	
110	ALLAN.	2.8	1 1 1 m 1 1	1.00	64,44	2.4		CP (BANK)	
44	6234	11	25.11	1	94.80			11 <b>3</b> 11	
le ant	85.765	Addam							
Anternation	4434	Addamant.							
(AL INTERN	7.10	Mannet	NO NO						

### ■ INPUT-ANALYSIS-SPSS OUTPUT

Input and type in variable view in SPSS

h	and the second division of the second divisio	E	New Co	 A. 1			<b>B</b> -3		1.100	19		
	And a	152	lineant.	1 (144)	Tanian (	1.45s		1	12	122	11	
			-		_					-		
			_									

Click Values ,then type

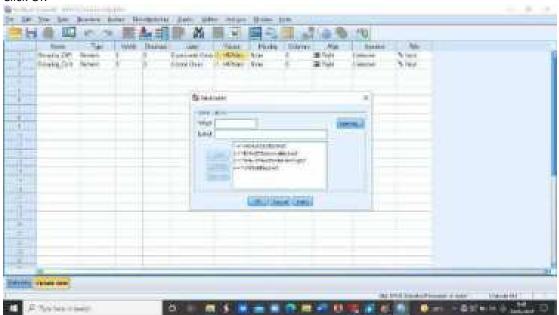
value =1 Label = <40% (not effective) add

Value =2 Label=40%-55%(Less Effective) Add

Value=3 Label=56%-75%(Effective enough) Add

Value=4 Label= >76% (Effective) Add

Click OK



THEN copy in control class on column values.

Click measurement-click Nominal

Trates?	n hant		land Land Constitution	Piterina Internet	UArm	Renau Riversid Riversid	
	-		-1			_	
-					-		

### INPUT THE DATA FROM EXCEL WORD

5. · · · · · · · ·
And do a good be good and and the state of
Terretories
COLUMN TO A COLUMNTA A COLUMN TO A COLUMNTA A COLU
AND CHARTER ON THE CALIFURNITY INCOME. THE TANK THE CALIFORNIA STOCKNER WERE SPECIFIC ASSOCIATION OF THE SECOND OF T

Then , copy the data from the excel Grouping experiment to GROUPING EXP SPSS

- 4		é e -			-	1 (	1. N. S.		1.14	1.0410		6
	name and the state				Channel State (sec)			a na shenne				
-	Approximation ( Law-	200		and a state of the	international local	-	-	Let III.				
	100	151	1	- 21	10.11 10.11			-				
	-			1	- 22							
	diminities (			13	22			1				
÷.,	100	1	4	-	10.11	1				-		
	100			14	NO.			1				
	(interfall)	Second Second										
										-		
										-		
							1 1 10		ERIC-			
										and in the	10 Mar 10	
(verit 6	en ben in merit nicht an statutione nicht den daram			0;								-
						100 (11)	1-2-5					-
			Deplementation	P A		100 (11)			-			
				P A	58		100	**	-			-
				P A	58		100	**	- 1-			-
				P A	58		100	**				-
				P A	58		100	**				-
				P A	58		100	**				-
				P A	58		100	**				
				P A	58		100	**				
				P A	58		100	**				
				P A	58		100	**				-
				P A	58		100	**				-

Back to the excel, Copy grouping of control class to GROUPING CONTROL IN SPSS

neti		-0.00				
interes					and the second	 ملکند 60 اف ا
- 123			100	90		(ase (*)
	4					

After Input the data - Click Analyze -Frequencies

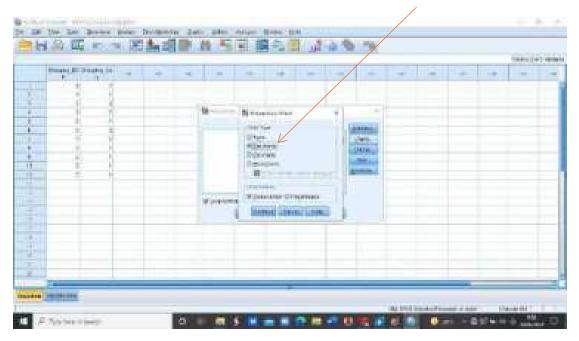
affinit mittier	Barner Barrymeter Ber									1	8
重要用于		- Lunin k		1.0 0	198					Same (	
	Benderstein Referenzen Seren Merine	4 Jane Barran Barran Barran Barran				4			-	1 m 7	
- Committee	Construction Additional Construction Constru	:					Taninira			-	
A Transmitter A Transmitter A State Same Same A State Same Same	Adda Stranov Trenspisonany Britisher						0	And in case of the local division of the loc	A DESCRIPTION OF		
A Training	Adda Stranov Trenspisonany Britisher		Disc III -	1-2-5		A DECK OF THE OWNER	and the second second	And in case of the local division of the loc	A DESCRIPTION OF	(b)	

100	公司	1	P. M. 2		367			-	
				***			*	-	

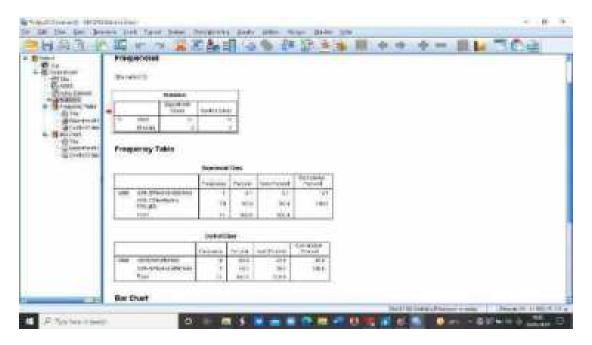
Move the experiment class and control class to the column variable(s) on the right

	当寺 あの田 職が悪 見らめ ま	Section 1
	이 운영 (이) 같이 많이	Card Call Land Co.
the state of the s		
1 1 1 1	Bestate (4)	
1 1 1	(annual Januari	
10 F F	A Firmed Rest Trees - Later Day	
	USE SUMMUS	
	and annual	
-	W preference and a second seco	
	Constituted and Second Second	
1 KH .		
7		
The second se		
Incodes Company Lines		

Click Bar Charts-Frequencies -continue-Click OK.



#### SPSS OUTPUT



### **INTERPRETATION OF SPSS OUTPUT TABLE "FREQUENCIES"**

Based on the output of "statistics", it is known that the valid N value is 11, meaning that the number of respondents entered into the SPSS is 11 students.

		Statistics	
I		Experiment	
L		Class	Control Class
ſ	N Valid	11	11
L	Missing	0	0

■ Then in the "Experimental Class" output for the Frequency and Percent sections, it is known that there are 1 or 9.1% students who get a gain score of <40%.Furthermore,there are 10 or 90.9% of students who get a gain score of 56-75%.

		Experiment	Class		
					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	40%-55%(less effective)	1	9.1	9.1	9.1
	56%-75%(effective Enough)	10	90.9	90.9	100.0
	Total	11	100.0	100.0	

On the other hand , in the "Control Class" output for the Frequency and Percent sections, it is known that there are 9 or 81.8% students who get a gain score of <40%. Furthermore ,there are 2 or 918.2% of students who get a gain score of 40-55%.

		Control C	Class		
					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	<40%(not effective)	9	81.8	81.8	81.8
	40%-55%(less effective)	2	18.2	18.2	100.0
	Total	11	100.0	100.0	

### **Bar Chart Output Figure**

The output image shows the frequency distribution of the gain score in the form of a bar chart (its interpretation is as contained in the frequency distribution table ).

# **17. ONE WAY ANOVA SPSS TUTORIAL & PRACTICE**

#### **Research Example**

A researcher wants to examine whether there are differences in the effects of three learning methods, namely methods A, B, and C on learning achievement. Class 1 A was taught method A, class 1 B was taught method B, class 1C was given method C. At the end of the semester, they were given the same test. For analysis purposes, 15 students were taken randomly from class 1A, 15 students were taken from class 1 B, and 15 students were taken from class 1C. Their score data are presented in table 1. If a significance level of 5% is taken, what are the conclusions of the study?

### One Way ANOVA Hypothesis Testing.

It is used to test the difference in the mean of three or more independent data groups (Everitt & Skrondal, 2006; Friedrich et al., 2017; Ioan, 2016; Kim, 2017; Ostertagová & Ostertag, 2013; Solutions, 1918; Wilmot & Mansell, 2014). The analysis prerequisites are:

- 1. Samples are taken randomly from the population.
- 2. The sample comes from an independent group.
- 3. The variance between groups must be homogeneous
- 4. The data of each group are normally distributed.

### Test Name: One Way Anova Test

### 1. Normality Test

			of Norm	anty			
	Metho	Kolmog	gorov-Sı	nirnov <sup>a</sup>	Sh	apiro-W	ilk
	ds	Statist ic	df	Sig.	Statist ic	df	Sig.
	Metho d A	.127	15	.200*	.947	15	<mark>.482</mark>
Learning_Achie vement	Metho d B	.166	15	.200*	.941	15	<mark>.397</mark>
	Metho d C	.146	15	.200*	.939	15	<mark>.376</mark>

### **Tests of Normality**

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### 2. Homogeneity Test

	8	eneg of varia			
		Levene Statistic	df1	df2	Sig.
	Based on Mean	1.589	2	42	<mark>.216</mark>
	Based on Median	1.178	2	42	.318
Learning_Achiev ement	Based on Median and with adjusted df	1.178	2	40.109	.318
	Based on trimmed mean	1.575	2	42	.219

### Test of Homogeneity of Variance

### 3. One way Anova SPSS Output

### Descriptives

Learning Achievement

	Ν	Mean	Std. Deviatio	Std. Error	95% Con Interval		Mini mum	Maxi mum
			n		Lower Bound	Upper Bound		
Metho	15	<mark>69.40</mark>	10.091	2.605	63.81	74.99	54	85
d A Metho	15	<mark>69.87</mark>	7.900	2.040	65.49	74.24	51	81
d B Metho	15	<mark>78.93</mark>	7.235	1.868	74.93	82.94	68	91
<mark>d C</mark>	4.5	70 70	0.410	1 402	(0.01		51	0.1
Total	45	72.73	9.413	1.403	69.91	75.56	51	91

### ANOVA

Learning_Achiev	rement				
	Sum of	df	Mean	F	Sig.
	Squares		Square		
Between	866.533	2	433.267	<mark>6.001</mark>	<mark>.005</mark>
Groups					
Within Groups	3032.267	42	72.197		
Total	3898.800	44			

### 4. Conclusion

There are 2 ways to draw the conclusion, first using F table and F count; second use significance value.

#### a. Hypothesis

Ho: There is no difference in learning achievement between the three learning methods.

Hi: There is a difference in learning achievement between the three learning methods.

### b. Test Criteria:

1) using F table and F count

- If F count  $\leq$  F table then Ho is accepted

- If F count > F table then Ho is rejected

2) use significance

- If sig  $\geq 0.05$  then Ho is accepted

- If sig < 0.05 then Ho is rejected

### c. Conclusions

### 1) Using F table and F count

- Define F table

The F table can be seen in the statistical book at a significance of 0.05 with dfl

= 2 and df2 = 42. The result is an F table of 3.220.

### - Comparing F table and F count

From the SPSS one way ANOVA output, it is known that F count is 6.001. The calculated F count > F table (6.001 > 3.220) then Ho is rejected. So it can be concluded that there are differences in learning achievement among the three learning methods. (Check the average learning achievement of each method in the descriptive table in the one way ANOVA output)

#### 2) Using significance value

From the SPSS one way ANOVA output, it is known that sig. of 0.005. Because 0.005 < 0.05 then Ho is rejected. So it can be concluded that there are differences in learning achievement among the three learning methods. (Check the average learning achievement rate of each method in the descriptive table in the one way ANOVA output)

Since Ho was rejected, it was continued with a further ANOVA test (Post hoc) to find out which of the methods were significantly different from the others. ANOVA further test used, for example, Scheffe test.

### Scheffe test

### **Multiple Comparisons**

(I)	(J)	Mean	Std.	Sig.	95% Confide	ence Interval
Methods	Methods	Difference (I-J)	Error		Lower Bound	Upper Bound
	Method B	467	3.103	.989	-8.34	7.41
Method A	Method C	<mark>-9.533*</mark>	3.103	<mark>.014</mark>	-17.41	-1.66
Method B	Method A	.467	3.103	.989	-7.41	8.34
Method B	Method C	<mark>-9.067*</mark>	3.103	.021	-16.94	-1.19
	Method A	<mark>9.533*</mark>	3.103	<mark>.014</mark>	1.66	17.41
Method C	Method B	<mark>9.067*</mark>	3.103	.021	1.19	16.94

Dependent Variable: Learning\_Achievement Scheffe

\*. The mean difference is significant at the 0.05 level.

 $Sig > 0.05 \rightarrow no difference$ 

Sig < 0.05 --> there is a difference --> (see the section on the mean difference marked with an asterisk)

#### **Conclusion:**

a) there is no difference in learning achievement between those taught using method A and method B.

b) there is a difference in learning achievement between those taught using method A and method C. The learning achievement taught using method C is higher than those taught using method A.

c) there is a difference in learning achievement between those taught using method B and method C. The learning achievement taught using method C is higher than those taught using method B.

### **17. TUTORIAL & PRACTICE**

### ONE WAY ANOVA \_NORMALITY TEST ,HOMOGENEITY TEST ,ONE WAY ANOVA SPSS .

### Research Example :

A researcher wants to examine whether there are difference in the effects of three learning methods,namely **methods A ,B ,and C** on learning achievement.Class <u>1 A was taught method A</u>, <u>class 1 B was taught method</u> <u>B ,class 1 C was given method C</u>. At the end of the semester ,they were given the same test.For analysis purposes, 15 students were taken randomly from class 1 A ,15 Students were taken from class 1 B ,and 15 students were taken from class 1 C. Their score data are presented in table 1. If a significance level of 5 % is taken ,what are the conclusions of the study?

### One Way ANOVA Hypothesis Testing.

Its used to test the difference in the mean of three or more independent data groups. The analysis prerequisites are:

- 1. Samples are taken randomly from the population
- 2. The sample comes from an independent group.
- 3. The Variance between groups must be homogeneous
- 4. The data of each group are normally distributed.

### <u>STEPS :</u>

### Go to Spss -Click variable view

34	A DESCRIPTION OF A DESC	1			3	-	*	the second second second		The second	Aug.	
	Ration Address of the Advancement	Type	1 944	[Deltain]	Lind	iner.	libert .	1 augus	and the second s	- Quant	Nigd	
	Man .	Banala	S	1		Sec.	Marc	1	270	Tillion .	Nat	
				-				·		and a construction	22.444	
-												
Ţ												
				_								
1.00												
1000				-								
1				_								
-												
14												
0.00												
-												
-												
-			-	_		-			-	-		
and second		_	-	_		-		_	_	_		_
	AT LOSS TO AT											

### **Click measure**

1.	line regin	Name Name Name	-	1	- 141	No.	Mar Har	Diam's H	22.04 20.04 10.04	A sound	No.	
			E									
L			-		_						_	

### Click and type Value =1

Value =1 Label =Method A Value=2 Label =Method B Value =3 Label=Method C

E des automations - C a	n	1
24- BERGNO-CT CO int Anton Amon An Do So So Underland	50 (dr. 84) 10	1.1.4
The date of the second of the second	10 <u>0</u> 0 10 <u>0</u> 0	
		4
		* 0 0 * 1
		0.0.0
AND II MADE TANKAN AND I WARE AND		2
Agence Agency Administration of the Contract of Manager Agency and Administration of the Contract of the Contr		
1 - Larentinan	CONTRACTOR AND	

## Copy and paste the data from excel

10010-00	······································	- 10														
2022	ander the	- 10 C	100	 1.1	1.60	176	121	Call 1	1411	1.0	1.00	1.61	19	6	10	(16)
- Byreid	1. M. C. M. L.									. 81			2.00			
1	- 77	1														
15	128															
1	1	1.														
	11	F 1														
	100															
9	100	1.1														
U.	19	1														
п —	10						_	_			_			_	_	_
e							_				_			_		
n.:																
M.	1		_													
8	17		_													
N'	1															
	10															
	1															
-		1														
	- 78															
	100	1.1														
	- 10	and the second														

### Paste in SPSS

												mains In	i) ia
	Sauring W.S.	Salar.		- 10		310		- 10	 	-	-	-	
	11							-					
1	11				1								
	11												
	<u>n</u>												
	11 15				-								
		1.0											
	19												
1	- 6												
1													
Ú.													
	11												
	167												
	- 10												
	16	1.1											
ē.,	- 64	12											
		1.1											
		1.1											
<b>1</b>	- 20	12											
		1											
1	10 10	1											
	1	-	 			_	-				1		-

### Check the Normality test with SPSS

**Open the SPSS -click Descriptive statistics -Explore** 

K

Ł

	color Trible Di Latore Konsta Tabl	Ebronini Linten Tottenen Ebron, Hillerten	111	11 51	5 2.415			den er ber
Carry Second Super Space	egen aktubutu aktubut	6						
2 DA TALVA								
	i presente i gante i g	<ul> <li>Tenness</li> <li>Sent</li> <li>Spectra construction</li> </ul>	i reases juni i njerena i Generalije Marenane i Marenane i Series Parater Bergane i Series Series Bergane i	Pressys     Second Statement     Second Statem	formany     journ     journ     mystermann     mystermannn     mystermannnn	Transve     Toursve     John     J	I Presson I press press Recommendation Recommendation Presson	Image: State of the state o

Move Learning Achievement to the dependent list on the right Move Methods to the factor list on the right.

1	name of the	100. Tom 1	w 0		-	-	18		-	-	1	1	(initially)
1	North Land												
	10			-		_	_						
	*	1.1.1		States.									
	100			1		100							
	n -		_	James	and the second	100	Ben's aff	Balaba					
		1		A WEAR				LIPHO					
	12 E	1.0				-		(04H)					
	- 100	1				1100	MC	- Later					
	11 N 72	- t -					4	distant and					
	. (1	1											
						in the	Dents:	_					
	. M.				_	-							
	41	100		(frame)									
	10	1.			ipan ()								
		1		and the	of the second	***							
	14 16	- I.		1			C1001						
	- 30	1			in the second	I PROVIDE	Testander Take						
	4) 14	1											
	- 46	- 1											
	27 14	2											
	M	. 2											
	1.00	3											
۰,	10		_	-	_	-	-	_					_

-			_											_	_	(Anto) Tak	10.
	Taking tul Terenar	Weight .		-	2.00		1.00	-			-	/	-	10.	200		
					_				_		/					_	
						and shall be a			_	-	1						
-		_				Distant.				./				_		-	
	10					-	-	127	inter int	K	im?						
	100	-							special lines								
	10	100						100									
	10							1.20	1.00								
								E *	FRE LOR	<		-					
	- 1														_		
-				_				Lan Lan	constant.						_		
-	M (1)	-		-	-								-	-	-		
		-				Sec. 1											
	- 12	-				1.00	Marine D	NG .									-
	19						1000		( Farse )	100							
	10	1					Contract of the			we a							
	19. 19. 19. 19. 19. 19. 19. 19. 19. 19.																
		-						1									
	一件																
1		- 13			-				_	_				-			

Click none on Bloxpots Click normality test CLIK Untransformed Click continue

-	a transferration		· 新聞 19 19 19			Car The second						Sec. 1
	barry and the	which an	with the state of the	-					1.00	-		
	- 14											
	(C)	E										
	1 1	- E	(\$1.000)					S Starte	in fet			( ) · · · ·
	PI	1			Without		-	120		- 110		-
	n		1	- 12	Planet at	-	Selation	1.00				
		1.			No. Township Town	Caller of Caller	100		a per staa		ber an distant	1
	10	1.			·		Arren		exercit parties		inger (	
	100	1 C C			Denor.	_	Benten	104	P.			
	11	- T-		100	A HADRED		Concerne .	· Wag	althout white	10		
	in N				and an				and the second s		_	
		1			Line Course	-		104				
	M	1			and the second second	-			en er bestel			
	46		199.41			= 7.		1000				-
			Base Dies	1000					airteini geochana	-		
	- 12		18.700 C. MA	ALL LAND		- 1		- m 12	Montenant .	-	-	
	12	3.1		1 (1P)	Prof. Lines.	-			(censes) (c)			
		1		State of the later	CAN BE IT MANAGED	Conception 1	-		A REAL PROPERTY.	10.0	10.000	
	61	1										
	- 04											
	10	- (B)										
	- 14	1										
		1.1										
	1				_	-		-	_		_	

### Click OK

										9 5				States 14	106
	inering for the least of	Nill an	1.00	-		1.001				( ) (P		-	2.00	2.000	
	the second	1				-									
	1	0			-										
	H	- 10			Street						<				
	1	16						or sort		-	2				E
	1	10			10			geore and a Z <sup>a</sup> Lagrada	Sec.	3444					
	н .17	- A.						ALC: NOT THE OWNER	Constantin	1000					
	34	- M.			1		1			Ser.					
	10	- X.					113	Liverine .		Bouton.					
	46	- X.						a Harnis	_	- Contraction					
	44							ALC: NOT THE							
	1	1						Line, not	-					-	
	100	10			1			at set of the	107	1					
	1	10			Sec.					I I					
	10	10				inter 0	122								
	N	167			a fee of	allower in	and the second								T
		2				( mails	Pares 1			1					
	1.00	2				Concession of the	ACCOUNT ON	Statistics of the second	-						
	87	1													Æ
	10	187													
	- 10	2:													
	2	1						_							E
	1.44														E
_	110	_	_	-	_			_				-	_		-

### Output of Normality Test

n interest National States and Recording The States States and Recording The States States and Recording States States and Recording States States and Recording States States and Recording States States and Recording States States and Recording States States and Recording States St	
Descet Al: Territoria Services	
The second secon	
arighe Aller Aller of the Solde of the	
CONV CARE_AMAGENE MALA II II II II II II II II Advers Real at a converte a converte	
6/14/14 00 00 00 00 00 00 00 00 000120 00 00 00 00 00 00 00 00 00 000120 00 00 00 00 00 00 00 00 00	
infrate inf	
Cast Constant Constitution 128 10 21	
AND DESCRIPTION OF A DE	
Con environment in a city	
Learning Achievement	

		Test	s of Normali	ιy			
		Kolm	nogorov-Smir	nov <sup>a</sup>		Shapiro-Wilk	
	Methods	Statistic	df	Sig.	Statistic	df	Sig.
Learning_Achievement	MethodA	.127	15	.200*	.947	15	.482
	MethodB	.166	15	.200*	.941	15	.397
	Method C	.146	15	.200 <sup>*</sup>	.939	15	.376

Tests of Normality

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

#### Levene Statistic df1 df2 Sig. 2 1.589 42 .216 Learning\_Achievement Based on Mean 1.178 2 Based on Median 42 .318 Based on Median and with 1.178 2 40.109 .318 adjusted df Based on trimmed mean 1.575 2 42 .219

#### Test of Homogeneity of Variance

2. One Way Anova SPSS Output.

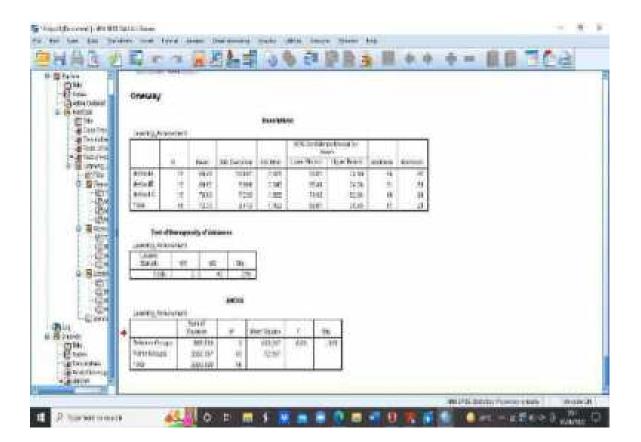
2h	a set and a	Developed balance Balance		1_04	3.8				Galda Inte	i (datalia
		Person year Road See any states being Propose germa meaning the search search processing proce	Cipro. Directory Top Historication ("non Directory ("non Direc				•		4	
2		£.			-					
-	11-				_					E.

_					1000							12.3.4
_	WANTER PROPERTY.										 Manada	d fried
	International Info	tali m or	d find the set	in the second			-	-	10	198		
	in .											
	0	1										
	- <b>N</b>	- N 11-										
		1	Stow Postena				1					
	10°.	1	a carrier									
		1.	1	290	1011.0	E alt	1.11					
	10	1	d through the			and the second						
		1 C C C C C C C C C C C C C C C C C C C	di Barretti			100						
	12	1 - C				1						
	10 10	- C - 11				1214						
		1										
	M	1		1111								
	- 46			- Per			11					
	P	1	and the second se		in the second second							
	11.1			Pair .	ALC: NO	and the second second						
	12	3										
	10											
		1.1										
	- 01	5										
		1										
	11	1										
	11					_		_	_	-	 -	_

	ALC: NO.				-		-	-					_		et initia
	Lawrence in the		1.00	1	1.000		100			1.001	2.00	-11	-	1	
	18.1	1													
1	- E.	1.													
Œ		1.													
£01.	1.				Bern					1					
6		1.			and the second	-									
							5 - City	-		1944 ( )					
	10	1.1			_	_	1	lands Ap	CONCERNS OF A						
6	- 0 - 10	1.								-					
	10	11								10 A A					
	- 44 10								13	erena,					
F.		1													
2	14						100								
6							10	1.1	-						
6		1			-	1	Concession, of Street, or	in the second second	Contraction of the						
Č.	- W.	1.1				1000	Same Real	a later	ALC: N						
	100	12 L			-										
	14-	10 C													
1	1	а 2													
	α.														
<u>.</u>	- B.	2													
	10	1													
Π.		1													

					was deline
tanaj ki anton	and a	10 - m - M		e leti s	
			Construction of the local of th		

							計馬				4.		_					Sec. 14	18
	and as	. Herbert				-	1.14	1.00	- T- 14				-	100	1.000			- 10-	
-	10000			_					-			-					-	-	-
	1						-												
	10		16				Sec. 2					-							
	W						and the state	- Address											
										Sec. 1	14								
	1									1 m	C. Street, P.								
									-										
	- M												111						
	10		-									1							
Щ					_					L		1					_	_	1
	1								100	Desir.							_		÷
			<u>.</u>				_	_		See.	1	÷.,							
			-	_					Profession of	Alexand Sec.	and the star	10					_		÷
	1		-					-	Concession of the	The second second			_						
			<u> </u>																
	- 24																		
	100																		
	10		7																
	×.		9																
	-											- 11							1
		_		-	-	-	_	-	_	-	_	_	_	_	_	-	_		-



#### ANOVA

Learning_Achieveme	nt				
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	866.533	2	433.267	6.001	.005
Within Groups	3032.267	42	72.197		
Total	3898.800	44			

#### 3. Conclusion

There are 2 ways to draw the conclusion, first using F table and F count ;second use significance value. A. Hypothesis

Ho:There is no difference in learning achievement between the three learning methods.

Hi:There is a difference in learning achievement between the three learning methods.

B. Test Criteria:

- 1) using F table and F count
- -If F count  $\leq$  table then Ho is accepted
- -If F count > F table the Ho is rejected

2) Use significance
-If sig ≥ 0.05 then Ho is accepted
-If sig < 0.05 then Ho is rejected</li>

#### C. Conclusions

1) Using F table and F count

-Define F atble

The table can be seen in the statistical book at significance of 0.05 with df1=2 and df2=42.the result is an F table of 3.220.

#### -Comparing F table and F count

From the SPSS one way ANOVA output ,it is known that F count is 6.001. The Calculated F value > F table (6,001> 3.220) then Ho is rejected .So, it can be concluded that there are differences in learning achievement among the three learning methods.

(Check the average learning achievement of each method in the descriptive table in the one way ANOVA output )

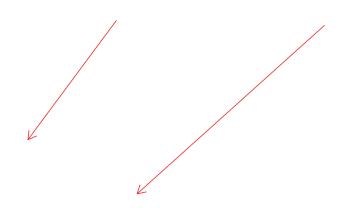
2) using significance value.

From the SPSS one way ANOVA output ,it is known that sig. Of 0.005.Because 0.005 <0.005 ,then Ho is rejected.So, it can be concluded that there are differences in learning achievement among the three learning methods.(check the average learning).

Achievement rate of each method in the descriptive table in the one way ANOVA output)

Since Ho was rejected ,it was continued with a further ANOVA test (post hoc) to find out which of the methods were significantly different from the others ANOVA further test used ,for example Scheffe test.

Scheffe test



- 0		Deter Mer dietates Trans	「「「「「「「」」」」	1) Li	9.10	- 10			Person and	(-two
1 2 1	anning Atl. Berlah annini 10 11 11 11 11 11 11 11 11 11 11 11 11	Logardens Jense Une ente Perangel Une Mate Age dete Dente Bayerne	El por El respectivo di respectivo Spectivo El pertorito El pertorito		1.44			*	44	
	1000	Service Servic								
		jeriarier fais Lianetag i Jarati i								
í.		Eveneta vetes.		-						
	-61	Reprintedation								
	4 4 10	garquarte i								
	<u></u>									

-	the little being and the		医晶素		出馬	-			2.9	-				Section 24	100
-	11400000	10000		_						_		 		10000-001-000	
	inning to a manager	Daniel III			1. 40.	. 16	11.001			1000	1.00	 1.000		2.483	
															Т
		1													
		1													
	$-\pi$	1			Di territy	11	-		$\backslash$	1					
	1.1	1.1			an - and	and the second									
		1.10					1. 14	and the first		ALC: NO					
	1.0.0.0	1.1					T P	erne klast Lämiten Artik	257 Sec. 1	Second					
	10.	1							199	the l					
	- 85	1					-								
	10 12	1							1.00	Color.					
		1													
		- C					11 11								
	- 10			-			- B	Milain							
	47	1			-	-		and the second							
	H H A	2				All of the local division of the local divis	Ride   Bar	1							
	н	2													
	14	1													
	1	120													
		2													
	7														
	1	2													
		- 2													
	11		_	_			-		_			_	_	-	-

	intern linear	dis not provide	10 (1889)	10000		ative (Mar	/						
	c n A	1 and	IP H			23		1 76					
					_		/	_					Note 1
internet in	100	-	and the second second	-	- 100		e	-	1.90		inger (		1.00
10	1.0					/							
	1		Sec.	no maint		th Comment			*				
			and the loss	www.paridak	/	Colorester.			-				-
- 20	1		30		2011	(There's	and						
10 10	1		1.24		These .	Sec. 1	distantion of						
100			k	and the second se	Separate Distant	Clinit	and the second						
10	1		1.14		( particul								
<u>.</u>			(Fing	112	2em		as Brillion	Real and					
M	1		Capelo -	danes de	and and the								
	-		- Ene	sevents .	Deriver	12 Depart	and The						
			10000	MARK THE									
11 A	2				Contracts.	-11	in l						
- 4	-		-		_		_	_	-				
.4	1												
20 10	2												
	1			-								-	
1	_			_	_	_		_					_
farben inne hierarit der Mit			0 E				Males au				at: - a	2.01	
A3 2		71				a p			10	4 =	R.I		Č.
	Foat Hoc	Testa	10		39	6 p	Natur Ma	11 o	1.0		RI		-
	Post Hec	Testa				En Comp	13	H 4	1.10		R.1		-
I OF CONTRACT	Post Hoc	Texts	No. of the second secon	etan ba eta langua ha langua	a (a)	BACING PRACES	Notes and		1.10		RI		-
I OF CONTRACT	Post Hec Seventers Seventers Seventers	Tada	n Bartan Marina Marina Marina			Paceton particul dis	10.00 No		1.4		RI		-
	Post Hoc	Texts	And			PACIFUL PARCIFUL June June June June	Martin and Martinet M				R.I		-
	Post Hec Seventers Seventers Seventers	Texts	Marco and			BACHER percent des des des des des des des des des des	Nation State National State				R.1		-
	Post Hec Several for Several f	Texts	And			BACING particul 104 104 104 104 104					RI		-
	Post Hec Several for Several f	Texts	A A A A A A A A A A A A A A A A A A A			BACHER percent des des des des des des des des des des	Nation State National State				8.1		-
	Post Hec Several for Several f	Taska Taska Denet Starket Milask Milask Milask Milask Milask Milask Milask	Harrison Barison Bari			BACHER percent des des des des des des des des des des	Nation State National State				R.I		-
	Post Hec Sevent for Sevent for Se	Tasta Tasta Datatus Mine Last Mine Last Mine Last Mine Last Mine Last Mine Last Mine Last Mine Last	National States			BACHER percent des des des des des des des des des des	Nation State National State				R.I		-
	Post Hec Seventers Seventers Seventers Seventers Vertical Vertical Vertical Vertical Vertical Vertical Vertical	Taska Taska Denet Starket Milask Milask Milask Milask Milask Milask Milask	National States			BACHER percent des des des des des des des des des des	Nation State National State				R.I		-
	Post Hec Sevent for Sevent for Se	Texts	National States			BACHER percent des des des des des des des des des des	Nation State National State				E.I		-
	Foat Hec Spectrum Spectrum Spectrum Spectrum versation v	Texts	No. Control of the second seco			BACHER percent des des des des des des des des des des	Nation State National State				RI		-
	Post Hec Spectrum Share The sec Share Shar	Texts Texts Developer Prove Retroit Re	Normality Normality			BACHER percent des des des des des des des des des des	Nation State National State				B.1		-
	For the second s	Tasta Tasta Data data Data data data data Data data data data data Data data data data data data data data				BACHER percent des des des des des des des des des des	Nation State National State				R.I		-
	Post Hec Spectrum Spectrum Spectrum Spectrum Verturk Witter C Hantger Hantger Kanta	Texts Texts Development Percent Million Millio				BACHER percent des des des des des des des des des des	Nation State National State				R.1		-
	For the second s	Texts	No. Control of the second seco			BACHER percent des des des des des des des des des des	Nation State National State				IR. I		-

#### **Multiple Comparisons**

Dependent Variable: Learning\_Achievement

Scheffe						
		Mean Difference			95% Confide	ence Interval
(I) Methods	(J) Methods	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
MethodA	MethodB	467	3.103	.989	-8.34	7.41
	Method C	-9.533 <sup>*</sup>	3.103	.014	-17.41	-1.66
MethodB	MethodA	.467	3.103	.989	-7.41	8.34
	Method C	-9.067*	3.103	.021	-16.94	-1.19
Method C	MethodA	9.533 <sup>*</sup>	3.103	.014	1.66	17.41
	MethodB	9.067*	3.103	.021	1.19	16.94

\*. The mean difference is significant at the 0.05 level.

#### Sig.>0.05 no difference

#### Sig.< 0.05 there is a difference (see the section on the mean difference marked with asterisk)

#### **Conclusion :**

A) There is no difference in learning achievement between those taught using method A and method B.

B) There is a difference in learning achievement between those taught using method A and method C. the learning achievement taught using method C is higher than those taught using method A.

D. )There is a difference in learning achievement between those taught using method B and method C. The learning achievement taught using method C is higher than those taught using method B.

### **18. TUTORIAL & PRACTICE TWO WAY ANOVA PART 1**

### Two way Anova

1. test the difference in the mean parameters of one dependent variable for more than two sample groups.

Two -way analysis of variance consists of two factors with two or more levels.
 Example:

The effect of learning model and self- efficacy ability on English teaching practice achievement (Field, 2005; Friedrich et al., 2017; Ioan, 2016; Iskandar et al., 2017; Oliver-Rodríguez & Wang, 2015; Solutions, 1918; Wilmot & Mansell, 2014).

- •
- ✓ Factor 1:Learning model with three levels :Standford Microteaching Model (SMM),Microteaching Lesson study (MLS) ,and Tadaluring Microteaching Learning Model (TMLM)
- ✓ Factor 2:Self -efficacy ability with two levels :high and low
- ✓ Teaching practice achievement is the dependent variable.

### **Example of manual calculation:**

This study aims to study the effect of learning models and self efficacy abilities on the practice of teaching English in the Microteaching class, for this purpose, three groups of random samples were taken to study using the Standfor Microteaching Learning Model(A1), Microteaching Lesson study (A 2), and Tadaluring Microteaching Learning Model (A3), Each group was randomly divided into two and divided into two based on self-efficacy abilities, namely the high group (B1), and the low group (B2). The score for the practice of teaching English is pretended as follows.

Learning Model (A)	Self -efficacy (B)	
	High(B)	Low(B2)
Standford Microteaching	85	69
Model (A1)		
	80	66
	90	69
	85	66
	90	69
	85	69
	80	68
	85	68
	80	68
	78	69
	79	
Microteaching Lesson self-efficacy	91	69
	89	65
	85	
	80	
	79	

	80	
	80	
	75	
	70	
	75	
	80	
	80	
	80	
	85	
Tadaluring Microteaching Learning Model (A3)	85	69
	90	69
	85	68
	90	65
	80	60
	85	69
	85	65
	80	60
	85	
	75	
	75	
	80	

1. Create research hypotheses with learning Ho and Hi

Research hypotheses with learning model factors

Ho(A) :There is no difference in the achievement of teaching English practice between propective teacher students who are taught with Standford Microteaching Model (SMM).Microtecahing Lesson Study(MLS),and Tadaluring Microteaching Learning Model(TMLM) ,in Microteaching class.

Hi (A) :There is a difference in the achievement of teaching English practice between prospective teacher students who are taught using Standford Microteaching Model (SMM).

Microteaching Lesson Study(MLS), and Tadaluring Microteaching Learning Model (TMLM) in Microteaching class .

Research Hypotheses with self-efficacy ability factor

Ho(B) :There is no difference in the practical achievement of tecahing English between student teacher candidates who have high and low self-efficay abilities in Microteaching class.

Research Hypothesis on the interaction of learning models with self-efficacy Ho(AB) :There is no interaction of achievement in teaching English practice between students who have high and low self-efficacy who are taught with standford Microteaching Model (SMM) ,Microteaching Lesson study (MLS),and Tadaluring Microteaching Learning Model (TMLM )in Microteaching Class.

## Type the data in ms excel

		N- a- 4- 2 2 2 2 2 4 1	1 X 44 2 2 4 4 1 1 1 1	ti Binisetter Statution -	正正在算品
		Contractory Approximation	Land Place (%)		angan a
	-		<del></del> -		- 10
and a family a f		1.00			And the second second second

Barris Barris	(.5.4) (Mar bered Acces	P Xi III	floot		Anne Anno Anno Anno Anno Anno Anno Anno	Maryan Markan Markan	14 2111 2111	
erall'stablepasse	Californi - 1		(644)	Anter	10.001	Contract of	25.00	
		(and a set						
		(Training			and a local diversity of			
		Land.			(news.)			
			A Charles and Series	e Bassett				
			Contraction of Contract					
				1000				
			CRC IIII	Lens				
nan an	6						• B	04040 •1=-02
Na berneler								•==+
No ber steller No ber steller	office Bergensterner	July also	Adam (Biller (B)					•==+
Ter ber bereit i	EAT		·····································	1 .7 a	9 19 1	- Anna	▲ #5 # 8	
The best seen						the second		
The law Brand				1		- Anner	• =: = B	
The best seen						- 100 - 100		•==+
The best seen		Same				- 100 - 100		•==+
The best seen		Antonio I Banani I Banani	And appending of the second se			the second		
The best seen		Barran				the second		
The best seen		Delan U				the second		
The best seen		Succession of the second secon	Antiper Bater B Antiper Bater B Antiper Bater Antiper Bater Antiper Antiper Bater Antiper Bater Antiper Bater Antiper			the second		
Ten ben bener Ben ben bener Ben Ster		Delan U				- 100 - 100		
Ten ben bener Ben ben bener Ben Ster		Delan U	Antiper Bater B Antiper Bater B Antiper Bater Antiper Bater An			- 100 - 100		
Ten ben bener Ben ben bener Ben Ster		Delan U	Antiper Bater B Antiper Bater B Antiper Bater Antiper Bater An			- 100 - 100		
Ten ben bener Ben ben bener Ben Ster		Delan U	Antiper Bater B Antiper Bater B Antiper Bater Antiper Bater An			- 100 - 100		

Copy and Paste the data from Excel to SPSS

110	Transition of the local distribution of the		_	_					_	1						_	(inter-	(*)*
		14.3444	Same in	2			-		1.4			-			1.42		-	1.00
				-														-
	1		0.	100														
				-														
										_								
-	_				_			-			_	_			_	-		-
-		-		1						-								
															_	-		
				ан. П														
				10 - C														
1	- 1		1	10														
				-														
			1	-														
6				1														
	_	-			_	_	_	_	_	-	_	_	_	_	_	-	_	_
2				1														
		-	-															
÷.,		-		14														
								_			_							
	Provide State	_				_	_		-		-	_	_	_	-			-

	Contraction of the second strategy and the second stra		 _			_		_	 		heles (w)
	served party	Berry Station Pr		- C		1.00	1 Freed	- 44	-	-	e. 1.
	2. AU										
	1										
	- I										
	£										
			 		_				 	_	_
2											
5						_					
						-					
_											
						-					
	181										
	- E-										
-	_			_						_	_

		11 5	孔圖包		20	10					-
International Inc. (19-1	Taking Prov				-	-	1.2		-	-	
	-				_						
1	1										
	1-1-										
1	1 62										
	1 4										
1 C	1. 10										
1	1 1										
	1 2										
	2										
	1. 1.										
	2 8				-				_		-
	5 2										
	2. 34			1.0							
	5 - 2		_	_	_			_			_
	327 (H)				_	_		-	-		-
	artes primate 2	etc. site	and the second second	SHM -					- 8 • ·		
P. Nacional a subset	nites Antes Deciminates J	ato alterio		SHM -			THE OWNER DESIGNATION.				20. - C
F Ann ben it samp. F Anna F. (1977) Server Star Bar (1979)		85		SHM -		10			-8+	- 5 2	23. - P - (*)
An an and a second		85			20	10	THE OWNER DESIGNATION.	A			23. - P - (*)
Constraints		85			20	10		A	-8+	- 5 2	23. - P - (*)
Constraints	Anter Maria Promotor Anterna	85			20	10		A	-8+	- 5 2	23. - P - (*)
An bearing	The Boltonia a	85			20	10		A	-8+	- 5 2	23. - P - (*)
Contract and Contract of Contr	Anter References and anter References ant	85			20	10		A	-8+	- 5 2	23. - P - (*)
An Anna Anna Anna Anna Anna Anna Anna A		85			20	10		A	-8+	- 5 2	
And the second		85			20	10		A	-8+	- 5 2	23. - P - (*)
An an annual annua		85			20	10		A	-8+	- 5 2	23. - P - (*)
		85			20	10		A	-8+	- 5 2	23. - P - (*)
An in a series		85			20	10		A	-8+		
		85			20	10		A	-8+		
And the second		85			20	10		A	-8+		
		85			20	10		A	-8+		
And the second		85			20	10		A	-8+		
An an and a second		85			20	10		A	-8+		

 second party in the	Thanking Prant				- 11	122	 1000	1100		-	10.00
 and the second s	and the second second	-		-			 		-	-	
1 S S S											
					_						
	17										
	100										
N. 1	1 10										
6. 3											
	14										
2 3	N. 18.										
2											
				_			 _				

#### Go to SPSS Click analyze -General Linier Model -Univariate

Move Teaching \_practice to dependent variable on the right. Move Learning \_Model and Self Efficacy To Fixed factor(S) on the right.

		11. 國名	- L				Sector ( w)
participant parties	and Lands Pass	-	last tas		6. 1. 6.	-	

### Then Click Model- click custom

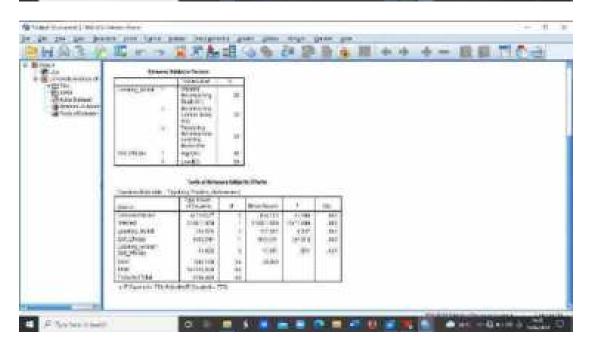
Canada and and and and and and and and an	
Constant Silver	
· [ [ hill [ house] ]	
The second secon	
T I I I I I I I I I I I I I I I I I I I	
an Anna Maria an Anna Maria an Anna Anna Anna Anna Anna Anna Anna	
Line and the second second	
	Area Distribution Distributi

annen jannet	ir()test basis	C C marine	 
1		- present	
		Descriptions De	
	- <u>k</u> -	2	
	2		
	N IS N. I.		
	- 1	The second secon	
		Strend Cherry, Care	

1111	trig with be (1940) has	I I Water I I		the second s	 Segar 2	10.0
			*jeter karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee karinetee			
		-	alig dimension Lineal Linea Linea			

### <u>Output</u>

	夏天春		0.9	64 (P)	Br (A	 CaleCode	-	
- Linter and Artic	you of Versen		1.1					 
Animate Parameter								
A LINK								
a harrow datasat	Repair Secure							
A set of the set of th	T General T		12					
100440_0-0-0-0_1	Breaking							
and the second second	district of the							
	BOARDANS	142						
	All	- 75						
	Series of	10						
	and the second							
(Add News) (1)	Marith.							
	Jen Li	11.	(C)					
and the second of	Tester Tester (199		a diama					
and the second second	and the second second			-				
(Sector)	distant.	1.1	Marg Wester.	114.11	100.1			
Concession at	ALCONOMIC ADDRESS		EALS.	10.044	100			
and a strength of the	25+075	- 12	1000	Control of	101			
Inst College	1000000	- 12	40.00	10.00	481			
1000 (1000)	11.000	1.4	1.000	and it	1.01			
Contract of the second s	100000	3.6	10.000					
		1.00						



### **Between-Subjects Factors**

Detween Subjects Factors						
		Value Label	Ν			
Learning_Mod	1	Standfor				
el		Microteachin	20			
		g Study (A1)				
	2	Microteachin				
		g Lesson	20			
		Study(A2)				
	3	Tadaluring				
		Microteachin	20			
		g Learning	20			
		Model (A3)				
Self_Efficacy	1	High(B1)	36			
	2	Low(B2)	24			

### **Tests of Between-Subjects Effects**

Dependent Variable:	Teaching_Practice	Achievement

	Type III Sum				
Source	of Squares	df	Mean Square	F	Sig.
Corrected Model	4173.823ª	5	834.765	41.540	.000
Intercept	310911.369	1	310911.369	15471.649	.000
Learning_Model	254.674	2	127.337	6.337	.003

Self_Efficacy	4055.541	1	4055.541	201.813	.000
Learning_Model * Self_Efficacy	34.602	2	17.301	.861	.428
Error	1085.160	54	20.096		
Total	347425.000	60			
Corrected Total	5258.983	59			

a. R Squared = .794 (Adjusted R Squared = .775)

#### Conclusion

Learning Model
 Fcount =6.337
 Ftable=3.170
 Fcount>Ftable,then Ho is rejected ,meaning that there is a difference in the achievement of teaching English practice which is taught using Standford Microteaching Model(SMM),Microteaching Lesson Study(MLS),and Tadaluring Microteaching Learning Model (TMLM) in Microteaching class.

2. Self -Efficacy Ability
F count =201.813
Ftable=4.020
Fcount>Ftable,then Ho is rejected meaning that there is a difference in English teaching practice achievement between student teacher candidates who have high and low self-efficacy abilities.

#### Or

Significance level 0.05

The significance of the test results p=0.003

The significance of the test results (sig)<significance level (0.003 < 0.05), then Ho is rejected , meaning that there is a difference in English teaching practice achievement between student teacher candidates who have high and low -self efficacy abilities.

3. Interaction of learning model with self -efficacy ability

f count=0.861

Ftable=3.170

Fcount<ftable ,then Ho is rejected ,which means that there is no interaction of teaching English practice achievement between student teacher candidates who have high and low self-efficacy abilities who are taught Standford Microteaching

Model(SMM), Microteaching Lesson Study(MLS), and Tadaluring Microteaching Class.

Or

Significance level 0.05

The significance of the test results p=0.428

The significance of the test results (sig)<significance level (0.428 > 0.05), then Ho is accepted ,meaning that there is no interaction between teaching English practice achievement student who have high and low self-efficacy abilities who are taught with Standford Microteaching Model(SMM), Microteaching Lesson Study (MLS), and Tadaluring Microtecahing Learning Model (TMLM) in Microteaching class.

### **Bibliography**

Allen, M. (2017). t-Test, Independent Samples. *The SAGE Encyclopedia of Communication Research Methods*, 13–14.

https://doi.org/10.4135/9781483381411.n636

- Ave, O. S. (1999). The Significance of Statistics in Mind-Matter Research. Society, 13(4), 615–638. https://www.ics.uci.edu/~jutts/JSE1999.pdf
- Chakrabarty, D. (2018). Understanding the Space of Research. *Biostatistics and Biometrics Open Access Journal*, 4(4).

https://doi.org/10.19080/bboaj.2018.04.555642

- Field, A. P. (2005). Discovering statistics using SPSS: and sex and drugs and rock "n" roll (2nd Edition). SAGE Publications, Inc. All. https://books.google.co.id/books/about/Discovering\_Statistics\_Using\_SPSS. html?id=IY61Ddqnm6IC&redir\_esc=y
- Franzese, M., & Iuliano, A. (2018). Descriptive statistics. *Encyclopedia of Bioinformatics and Computational Biology: ABC of Bioinformatics*, 1–3, 672–684. https://doi.org/10.1016/B978-0-12-809633-8.20354-3
- Friedrich, S., Konietschke, F., & Pauly, M. (2017). GFD: An R package for the analysis of general factorial designs. *Journal of Statistical Software*, 79(July). https://doi.org/10.18637/jss.v079.c01

Garth, A. (2008). Analysing data using SPSS ( A practical guide for those unfortunate enough to have to actually do it .). https://students.shu.ac.uk/lits/it/documents/pdf/analysing\_data\_using\_spss.pd f

Gerald, B. (2018). A Brief Review of Independent, Dependent and One Sample t-

test. International Journal of Applied Mathematics and Theoretical Physics, 4(2), 50. https://doi.org/10.11648/j.ijamtp.20180402.13

Horton, N. J., & Switzer, S. S. (2005). Statistical Methods in the Journal. New England Journal of Medicine, 353(18), 1977–1979.
https://doi.org/10.1056/nejm200511033531823

Ioan, M. (2016). The Heat Treatment Parameters Analysis Using Two-Way ANOVA Method. *Recent*, *Vol.17*(no.1), 33–40. https://www.recentonline.ro/047/Milosan-R47.pdf

Jackson, S. L. (2009). *Research Methods and Statistics A Critical Thinking Approach* (Third Edit). Wadsworth Cengage Learning. www.ichapters.com

Johnson, R. B. (2014). Educational research: Quantitative, qualitative, and mixed approaches /R. Burke Johnson, Larry Christensen. — Fifth edition. In نشورات جامعة دمشق (Vol. 1999, Issue December). SAGE Publications, Inc. All. https://books.google.co.id/books/about/Educational\_Research.html?hl=id&id =6gFHDQAAQBAJ&redir\_esc=y

Kim, H., Park, C., & Wang, M. (2018). Paired t-test based on robustified statistics. 2018 Korean Society of Industrial Engineers Fall Conference and Regular General Meeting, Seoul, Korea, November, 2347–2353. https://www.researchgate.net/publication/329024164\_Paired\_ttest\_based\_on\_robustified\_statistics?enrichId=rgreq-3c6c7fbb9536a1e79f42290bc4b4a071-XXX&enrichSource=Y292ZXJQYWdlOzMyOTAyNDE2NDtBUzo2OTQy MzY2MzA0OTExMzZAMTU0MjUzMDMxOTQ2Mg%3D%3D&el=1\_x\_2 &\_esc=pu

- Kim, T. K. (2017). Understanding one-way anova usinKim, T. K. (2017). Understanding one-way anova using conceptual figures. Korean Journal of Anesthesiology, 70(1), 22–26. https://doi.org/10.4097/kjae.2017.70.1.22g conceptual figures. *Korean Journal of Anesthesiology*, 70(1), 22–26. https://ekja.org/journal/view.php?doi=10.4097/kjae.2017.70.1.22
- Oliver-Rodríguez, J. C., & Wang, X. T. (2015). Non-parametric three-way mixed ANOVA with aligned rank tests. *British Journal of Mathematical and Statistical Psychology*, 68(1), 23–42. https://doi.org/10.1111/bmsp.12031
- Orwa, G., Mung'atu, J., Kenyatta, J., Rono, B. K., Mungatu, J., & Wanjoya, A. (2014). Application of paired student t-test on impact of Anti-retroviral therapy on CD4 cell count among HIV Seroconverters in serodiscordant heterosexual relationships: A case study of N... Application of paired student t-test on impact of Anti-retroviral thera. *Mathematical Theory and Modeling*, 4(10), 61–71.

https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.844.5521&rep=re p1&type=pdf

Ostertagová, E., & Ostertag, O. (2013). Methodology and Application of Oneway ANOVA. *American Journal of Mechanical Engineering*, *1*(7), 256–261. https://doi.org/10.12691/ajme-1-7-21

Parthiban, S., & Gajivaradhan, P. (2016). A Comparative Study of One-Sample t-Test Under Fuzzy Environments A Comparative Study of Two-Sample t-Test Under Fuzzy Environments Using Trapezoidal Fuzzy Numbers. *International Journal of Mathematics and Statistics Invention (IJMSI)*, 4(1), 17. https://www.researchgate.net/publication/295869101\_A\_Comparative\_Study \_of\_One-Sample\_t-Test\_Under\_Fuzzy\_Environments

Rasch, D., Spangl, B., & Wang, M. (2012). Minimal experimental size in the three way ANOVA cross classification model with approximate F-tests. *Communications in Statistics: Simulation and Computation*, 41(7), 1120–1130. https://doi.org/10.1080/03610918.2012.625832

- Rusydi, A., & Fadhli, M. (2018). Statistika Pendidikan: Teori dan Praktik Dalam Pendidikan. In *Cv. Widya Puspita*.
- Sharma, S. (2017). Definitions and models of statistical literacy: a literature review. Open Review of Educational Research, 4(1), 118–133. https://doi.org/10.1080/23265507.2017.1354313
- Singh, Kumar, Y. (2006). Fundamental of Research Methodology and Statistics. In منشورات جامعة دمشق (Vol. 1999, Issue December). New Age International (P) Ltd., Publishers. https://mfs.mkcl.org/images/ebook/Fundamental of Research Methodology and Statistics by Yogesh Kumar Singh.pdf
- Singpurwalla, N. D., & Lai, B. (2020). What Does the "Mean" Really Mean? Journal of Statistics Education, 19(2), 1–20. http://arxiv.org/abs/2003.01973
- Solutions, S. (1918). *Statistics Solutions Advancement Through Clarity ANOVA* (Analysis of Variance). 1–10. http://www.statisticssolutions.com
- Vanlalhriati, C., & Singh, E. N. (2015). Descriptive Statistics in Business Research. International Journal of Advanced Research (IJAR), 3(06), 1409– 1415. http://www.journalijar.com/uploads/17\_IJAR-6292.pdf
- Wagner, W. E. (2015). Using IBM SPSS statistics for research methods and social science statistics. In *Syria Studies* (Vol. 7, Issue 1). SAGE Publications, Inc.

All.

https://www.researchgate.net/publication/269107473\_What\_is\_governance/li

nk/548173090cf22525dcb61443/download%0Ahttp://www.econ.upf.edu/~re

ynal/Civil wars\_12December2010.pdf%0Ahttps://think-

asia.org/handle/11540/8282%0Ahttps://www.jstor.org/stable/41857625

Wilmot, E. G., & Mansell, P. (2014). Diabetes and pregnancy. In Clinical Garth,

A. (2008). Medicine, Journal of the Royal College of Physicians of London

(Vol. 14, Issue 6). https://doi.org/10.7861/clinmedicine.14-6-677

Analysing data using SPSS ( A practical guide for those unfortunate enough to have to actually do it .). https://students.shu.ac.uk/lits/it/documents/pdf/analysing\_data\_using\_spss.pd f



